It was just about one year ago that I took delivery of an early Lightning kit from Composite ARF. In the intervening 12 months the Lightning has become one of my favorite planes, and I have logged 120 relatively trouble free flights with the model. At the time of purchase, I had debated over engine choice, finally settling on the Jet Central Rhino as it delivered a one to one thrust to weight ratio in the Lightning. It has proven to be a good match for the aircraft, delivering excellent performance and consistent reliability.

When Composite ARF announced an 80% version of the Lightning, dubbed the "Flash", it was a natural thought to pair it up with the Jet Central Falcon as the thrust to weight ratio was similar to that of the Rhino/Lightning combination. Jet Central approached me about taking on the project, and I quickly agreed.

Flash Kit Data

The Flash arrives in one large box, though the landing gear kit and optional auxiliary fuel tank ship separately. The contents inside the box had shifted slightly, but all parts were well separated by foam and bubble wrap so there was no damage.

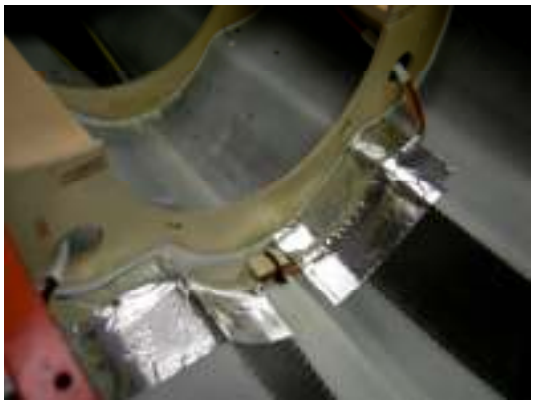
While the profiles of the Lightning and the Flash are nearly identical, the engineering of the Flash targets ease of construction and overall simplicity. The Flash is assembled from only three main components, including a fuselage with integrated nose cone and vertical stabilizer, a one piece wing and a horizontal stabilizer. There are no gear door systems to plumb, as the wheels retract into formed pockets in the bottom of the wing and the small nose gear door is closed by air pressure in flight. Other time saving design elements include a pre-mounted canopy frame, factory installation of all required formers and a fuel system that has been assembled and leak tested at the factory. I had been impressed with the amount of prefabrication evident in the Lightning but the Flash has set a new standard for simplicity and ease of construction.

While the quality of the rather intricate paintwork was excellent, it was not quite up to the Lightning standard in my view, and there were a few minor surface voids in the glasswork near some seams. Fortunately, these tended to be in areas not readily visible.

The Build

The total construction time for the plane turned out to be one week, book ended by two full weekends of assembly time. The speed with which the plane came together surprised me as I am not a particularly fast builder. Parts fit was excellent, which eliminated a significant amount of cut and fit labor that typically accompanies many kits. A very complete set of hardware, including a bag of extra spare parts, and an excellent instruction manual also helped speed the build.

There are a few tools I'd recommend you have on hand. A Matchmaker or comparable servo adjusting tool is of great aid in setting up control arm position and locating servo arm slot locations. I found a long drill and a telescoping magnet handy at many points during construction. For those in the US, you will need a set of metric ball drivers. Safety wire pliers and a drill stop are also very useful, though not mandatory.



Since the three primary structural components – the fuselage, wing and stab – require only four bolts for assembly the initial construction process technically takes just a few minutes. The remaining work breaks down into five primary tasks. These include installation of the servos, the pipe and bypass, the fuel system, the landing gear and the engine itself. These construction tasks are well detailed in the instruction manual that is available for download from the Composite ARF website, so I won't walk through all the building steps here. You will find that the amount of prefabrication and the simplicity of the installations for each of these components allow the work to progress quickly and smoothly.

I will offer up a few additional pointers that I took away from the building process. First, I would change the sequence a bit and install the rudder servo before working on the horizontal stabilizer. Access to the rudder servo pocket is easier if you are able to work through the stab opening. Check the rudder servo mounting former carefully and reinforce the glue joints with Aeropoxy if necessary. Mine broke loose during the rudder servo installation. Also, when drilling holes from the underside of a component for cover mounting screws, use a drill stop or wrap masking tape around the drill bits to prevent them from penetrating through the top of the flight surface.

With regard to the landing gear, make sure not to file the flat spots for the set screws too deeply as it will weaken the pins at a critical point. Remember to set a few degrees of toe in on the main gear to aid in runway tracking. Both of these have been factors in early Flash incident reports. Since the nose gear does not come with any self centering mechanism, I glued two wood blocks to the nose former just under the steering arms with the gear retracted. This will lock the wheel in an absolutely vertical position and prevent twisting during flight which could cause the gear to hang on the gear opening when lowering. I used this same technique on the Lightning and it has worked very well.

Make sure you also grind away enough clearance in the nose gear opening and formers such that a slight twisting of the nose gear during retraction will not cause the strut to hang up on these structures. The steering cables also need to be installed in such a way that they do not contact anything when the gear is retracting, causing the gear to twist and preventing a full retraction.

I also replaced the 10-ounce header tank with a BVM Ultimate Air Trap. The plywood structure that was designed for the header tank is easily modified to hold the UAT. Other than these minor points, the model building process conforms very well to the instruction manual.

The model weighed exactly 23 pounds, including 9 ounces of counterbalance weight in the nose to achieve a forward CG position. Two 4000 mah Duralite batteries power the ECU and receiver. Flat packs will fit nicely in the battery compartments that are integral parts of the nose former structure. As I kept the build fairly standard, these are typical of the weights you should expect.

At just under four inches in diameter, the Falcon fit nicely into the bypass, with plenty of room for cool air to move around the engine. Since the turbine sits to the rear of the Center of Gravity, weight is also an important consideration. At 3.3 pounds, the Falcon is a solid choice in this regard.

Jet Central and the Falcon

Jet Central is a subsidiary of Diseno Y Metalmechanica, a company based in Mexico City that has been manufacturing automotive parts for GM, Ford and Nissan for over 40 years. The company takes pride in it's capability to generate advanced tooling, a capability that it applies to the manufacture of its Jet engines.

The force behind Diseno Y Metalmechanica and Jet Central is Felipe Nieto. Felipe has been a modeler his entire life and the intersection between his mechanical engineering background and modeling interest led to the evolution of the Jet Central line of engines. The basic design of the engine was penciled by Felipe, though early in

the development he tried to adapt the KJ66 inconel turbine wheel designed by Jesus Artes. Ultimately, it was not a good fit with Felipe's design, so this effort was scrapped. In 1997 Felipe traveled to Spain, showed Jesus his design, and ultimately both a new turbine wheel and partnership between the two men were born. The Bee was the first effort of their collaboration, and was sold primarily in Europe as AMA approval slowed the marketing in the United States. In 2002, the Bee and the new Eagle both received AMA approval and the company began to sell into the US. In 2004, the company introduced the Falcon. Artes and Felipe worked together until 2005, when Artes moved on to larger commercial engines and the partnership dissolved. The last engine in the line, the Rhino, was a collaborative effort with Gaspar Espiel, who has been manufacturing ECUs for Jet Central. Gaspar was manufacturing the Merlin, and he and Felipe both contributed parts to the newly designed engine.

The Jet Central engines have had a reputation for very quick throttle response, and Felipe contributes this to the amount of engineering effort that has been invested in the diffuser section. More efficiency in the diffuser translates into better thrust and quicker spool up times. These engines are also developed and tested regularly at 7000 feet of altitude, with the thought that if they perform well in this regime performance at lower altitudes will only be better. Felipe stated that the company takes special pride in meeting or exceeding their published performance specifications.

On the service front, Jet Central tries to provide one week turnaround on repairs, though Felipe indicated that this is not always possible. Since the parts are manufactured at his facility in Mexico City, inventory shortage is not an issue. The factory also keeps detailed data on each engine so they are familiar with the complete history. Replacement parts, when required, are always upgraded to current standards. Most of the technicians who service engines have been with Felipe through the entire design and development process and four of the six staff have engineering degrees. Last but not least, Jet Central has just announced a lifetime warrantee that covers all parts for the life of the engine, excluding crash damage. This warrantee can even be transferred at a nominal cost if the engine is sold to another third party.

Jet Central has now sold over 550 engines into the market. Sales year over year have shown steady growth of approximately 20% per annum, as the product line expands and a worldwide marketing network takes shape. The growth has recently prompted the company to seek new, larger facilities. A growing worldwide service network will back up sales.

Flying the Flash

The Flash fit nicely into the back of my Sport Utility Vehicle. Getting ready to fly at the field is quick and easy. The leading edge of the one piece wing is held in place by two stout pins and two bolts at the rear of the wing complete assembly. As I had installed the optional wing tank, hookups include a fuel connection, air quick disconnects for the gear and brakes and finally servo leads for flaps and ailerons. I fit a Festo shut off valve to the 6 millimeter tubing to

the wing tank, in order to seal it against leakage during transport. A simple plug suffices at the connection point to the main tank. The component boards supplied with the kit allows for very efficient utilization of space and even someone with large hands will not struggle with the various connections.

Only two flights were needed to set trims, control throws and dual rates. Much like the Lightning, the throws suggested in the manual are fairly aggressive and I ended up dialing them back. I used 45% exponential on the ailerons and elevator in normal flight mode, as the flight surfaces are all relatively large and very effective. At this setting maneuvers were smooth yet full movement of the sticks produce impressive results. Balance required 7 ounces of nose weight, though I used 9 ounces for the initial flights to move the CG to the more conservative forward limit. Flight experience confirmed that the CG range specified in the manual is accurate.

As I had expected, the flight characteristics of the Flash are very similar to the Lightning. There is a wide variation in speed potential as the Flash slows nicely with full flaps and handles a high angle of attack without a tendency to stall. Landing speed is slow enough that the plane would make an excellent short field model with a little practice. I would compare the overall experience to that of a very good pattern model, with very linear tendencies and crisp, authoritative controls.

The Falcon proved to be an excellent match for the airframe. On the top end, speed and vertical performance will challenge the reflexes and sight of most pilots. A setting of half to three quarter throttle produces a very comfortable flight with adequate power for any maneuver. Presentation in the air is excellent and the long nose, integrated tip tanks and large vertical fin eliminate the orientation problems common with models of this size.

After a weekend of test flying and several more days in the air at the Pensacola Jet Meet, satisfaction remains high with the Flash. The airplane did develop a slight delamination of the surface skin from the underlying foam

structure at the flap hinge. To repair this area, first tape over the living hinge groove on the inside of the flap to protect the hinge from excess glue. Mix your choice of finishing resin and heat a bit if necessary to make sure it will completely wick into the separated area. Carefully separate the hinge material from the flap to expose the delaminated area. Using a spatula or some other thin piece of rigid material carefully spread the finishing resin to the area of repair. When satisfied, clamp a piece of ply over the surface until the glue dries to insure a level repair. Again, take precaution not to have any excess ooze out and puddle at the hinge line. The foam in the flash is CA compatible, but it is not recommended for this type of repair, as it will be brittle when it cures.

The Flash attracted a fair amount of attention at Pensacola, and I think it would be fair to say it was a crowd pleaser. It handled the windy conditions well, and new owner Eric Clapp became comfortable with the model almost immediately. I will admit that I was a little sad to hand the Flash over to Eric, as I had formed a quick bond with the plane. In my final evaluation, I think the relatively low investment in the Flash/Falcon combination compared to the appeal and performance of the package makes it worthy of a close look.