From Dream to Reality . . . The building of an Autogyro:
Interview with designer/builder David Gittens
AnnA Cybele, August 2023

Reserve Grand Champion: The Ikenga 530Z taking off in June 1988 piloted by Mark Hallett

“At age four I would fly among the stars, visioned motorcars that morphed into various shapes whilst changing colors at the snap of a finger. Homes floated in the sky, boats hovered above the waves, and the musty soft soil in our garden, the land of little creatures, their world, and my world, ONE. I was called a Daydreamer: . . . However, like you, I felt the pulse of the Universe!

Recalling the adrenaline rush when experiencing the first test flight of my Ikenga 530Z autogyro aircraft in the spring of 1988, followed by design awards at airshows across the United States prior to its acceptance into the Smithsonian National Air and Space Museum collection in Washington, DC years after this flight, brings a smile of gratitude. There is also amazement, to this eighty-four-year-old artist/innovator/self-taught aircraft designer, at how it all happened. In the flash of time between my first thoughts of flight and now, where and how did it all begin?” David Gittens

1. What was your inspiration for designing an aircraft?

My inspiration to design and build an Autogyro was catalyzed at a meeting with Wing Commander Ken Wallis, who became famous for flying his historic Little Nellie Autogyro in the James Bond movie You Only Live Twice. I met Ken on a fashion photography assignment I was on for Queen Magazine when a photoshoot featured his aircraft as the background for models. Our mentorship/friendship grew from this meeting, and he was the one who encouraged me to create minimal structure Autogyros for utility
applications in Third World cultures. My first commission to design/restyle a four-passenger Autogyro however came about in 1965 for a company in Blackpool, England.

Mentors: Wing Commander Ken Wallis of James Bond 007 fame and David with Autogyro instructor, Bill Parsons.

2. Why were autogyros being created? Is there an expected need and use for creating them?

Autogyros are the invention of the Spanish engineer Juan de la Cierva who, in 1919, was seeking to create a safe and cost-effective flying machine. He developed/refined these unique aircraft for almost two decades, and they were produced under license in the United States. The Autogyro with its unpowered free-spinning rotary wing relied on a powered propeller in a tractor configuration to propel it forward. The relative wind then caused the free-spinning rotor to turn and, with its angle of attack at a specific rotor speed, the aircraft would lift off. Early Autogyros were often referred to as ‘Flying Windmills’ due to this configuration, and these aircraft gained acclaim in the 1920s and 1930s for utility, commercial, and personal transportation. Autogyros were the most coveted rotary wing aircraft before the birth of the Helicopter industry by Heinrich Focke in Germany in the 1930s. The Pitcairn-Autogyro Company successfully produced these aircraft under license in the United States for commercial applications such as postal deliveries. Unlike the Autogyros' need for a runway requirement for take-off and landing in the early days of their development, and in spite of a jump-takeoff capacity developed for the Autogyro in later years, the newly perfected Helicopters offered vertical take-off and landing functionality. The improvement and development of the Helicopter design and engineering brought about the demise of the commercial viability of the Autogyro. As the Helicopter proved more valuable for military applications heading into, and through, World War II the armed services in the United States invested vast sums of money in their development, perfecting the Helicopter as a rotary wing aircraft using a powered rotor system. The irony of the Helicopter’s success in the United States is that the US government infringed on the patents held by the Pitcairn Aircraft Company. The sharing of these patents with a number of Helicopter manufacturers via research and development contributed to the success of this vertical take-off and landing rotary-winged aircraft.

3. How, and why, did you enter the field of aviation?
I entered the world of aircraft design and construction twenty years following my meeting with Wing Commander Ken Wallis. Although, in the mid-seventies, I was invested in the design and construction of a flying abode... a vehicle based on a semi-rigid airship powered by a Yamaha motor. While this concept of a flying miniature home kept my attention for a short time, the cost and airbag technology of the day limited the feasibility of that project going forward.

My reality when entering into aircraft design was as an artist wanting to launch a conceptually new, safe, and efficient aircraft that would be cost-effective in Third World countries. I envisioned my Autogyros as easy to maintain, and simple to assemble using conventional tools when supplied to customers as a kit-delivered aircraft. I set about learning as much as possible about Autogyro design, engineering, airfoil dynamics, composite design, operating a lathe, and learning to fly both fixed-wing aircraft and Autogyros. Importantly I had gathered around me a great team of mentors and enthusiasts with skills in every area of aircraft design, and this proved to be my greatest gift in this process. Dr. Egor Bensen, creator of the Bensen Gyrocopter, greatly encouraged me along with members of the PRA (Popular Rotorcraft Association). They formed my foundation for all aspects of this process. Another of my mentors flew combat missions in the Free French Air Force during WW II, and his experiences encountering UFOs on combat missions led him to become a lecturer on this topic in the US. A SAC B-52 captain who heard about my project came to my hangar to lend support and guidance. Teamwork and camaraderie were key to all of the unfolding steps, and pivotal towards gaining the awards that awaited our aircraft following the required FAA inspection and test flight of Ikenga 530Z in the spring of 1988, and its debut in the summer months at many air shows across the country. My most dedicated supporter was a retired CEO of a Canadian aircraft company who had first invested in my Mazda-powered Wind Dancer Autogyro, doing so specifically to show me that I could not achieve my goal. He told me, “You’ll discover it will be too painful a process, and you’ll give up!” When he and his wife returned from a trip to Australia and discovered my prototype was complete, he then brought other investors on board.
4. Can you explain what it was like to begin to make your dream real?

I nurtured the dream of creating flying machines for many years, however, the beginning was simple. People came into my life who believed in my vision of creating a unique flying machine for Third World countries, and for the sports recreation market in developed countries. Strangers, who became core supporters, believed in my artistry, and my aircraft models, and that I could learn how to build my proposed aircraft. They underwrote my project financially, lent their knowledge and technical expertise, gave legal support, donated required parts, and taught me to fly . . . and when not to fly. Not one step towards my dream could have begun without the first, second, and third round investments. Importantly, as an artist innovator, it was exhilarating for someone to say: order what you need and we'll cover the cost; let us show you how to use a lathe; let us assist you with a business plan.

5. Can you describe how you approached the building of your aircraft?

Growing from concept drawing and clay models into a fully functioning aircraft, it was important from the beginning to know the projected power-to-weight ratio of my proposed flying machine, to determine its payload capacity, its projected performance window and range, and to factor this into the reality of our airport altitude of 6,800 feet above sea level, where altitude densities are often above 10,000 feet. From the outset, the powerplant that was high on my list due to cost, availability, and power-to-weight ratio for our projected performance was the 95 HP Suzuki water-cooled snowmobile engine. This engine weighed under 100 pounds and could be easily mated with a 5.8 to 1 gear reduction unit, so that our ground adjustable three-bladed propellers would work most efficiently with the high-revving Suzuki powerhouse, whilst aiming for 300 pounds of thrust in a pull test.

6. What are memorable steps in the building process?

There were five pivotal steps: (A) Creating the frame (B) Successful hang-test (C) Keeping a log for the FAA flightworthy certificate (D) Choosing not to test-fly my own aircraft (E) Teamwork.

A (Creating the frame) - In developing the Ikenga 530Z as a tractor Autogyro (engine in the front) I was determined to create a frame that gave the pilot clear vision and also incorporated a roll bar for safety. I solved this by creating an inverted U of 1.5” x .058 4130 chromoly tubing, which is actually two pieces, welded together at the top, along with a square tubing socket that receives the rotor mast and cheek plates. The inverted mast bolts to the double 5051 T6 dual tube beams that incorporate the main landing wheel axles, stiffening it considerably; the keel is 6061T6 square tubing. The axles themselves are 4130 tubing with nylon insert plugs. The wheels are 6:00 x 6 Hegars, with hydraulic brakes which are simultaneously applied by the pedals. The pilot sits on a modified 25-gallon NASCAR-approved gas tank.
in a position akin to a racing motorcycle. In this aircraft, the pedal controls are behind the pilot. An important but somewhat obscure item of Autogyro design is the requirement of a large ground "turnover angle," which should be designed into the aircraft to prevent ground looping or rolling.

B (Successful hang-test) - The aircraft's weight/balance of all components has been carefully measured and logged so that, for optimal engine-out flight control, the correctly balanced aircraft hangs at nine degrees nose down with a 180-pound pilot in place and the gas tank half full.

C (Keeping a log for the FAA flightworthy certificate) - One of the most important disciplines in the building of the Ikenga 530Z was its construction log, a book containing each of the components that have gone into the aircraft, along with their noted weight and photo. This log would be signed off on by the FAA official who inspects the aircraft's workmanship and safety before an Airworthiness Certificate is issued.

D (Choosing not to test-fly my own aircraft) - Choosing not to test-fly my own aircraft was a big reality check! Like all innovators and creators in the PRA club, I pictured myself flying my new little bird. This was a dream from the first drawings and now, having passed my pilot's test in a Cessna and building up hours in a tandem Autogyro trainer, I thought this a guarantee. However, my flying instructor, Bill Parsons, heard about my plans and pulled me aside one day saying, "David, your ship is an unknown bird and you have only twenty hours in the trainer . . . if you attempt to fly your ship you'll kill yourself! Get someone with experience and high hours to test Ikenga for you!" My expectations were shattered, however, I accepted his advice and put the word out. Within days I received a call from Mark, who was just out of the Air Force and had hundreds of hours of Autogyro flight time. He loved our project at first sight, and brought his enthusiasm and expertise to our team. For me, this was the beginning of a life-long friendship.

E (Teamwork) - Teamwork during this aircraft building process became a community project that happened in Santa Fe, New Mexico. Many in the community gave their skills and energy towards its success, and everyone celebrated our aircraft's awards and accolades as they accumulated and followed this success in the local and national press. Importantly, many were on pins and needles as the day approached for the first test flight at the Espanola, NM airport.
7. Can you describe what it was like to experience (from the ground) the successful maiden flight of your designs?

We trailered the aircraft to the high desert airfield early on a bright and windy May morning, having much concern about the twenty-knot crosswind blowing across the runway. Prepared for a long day of testing and adjustments, we assembled the twenty-three-foot Skywheels rotor to the Parson’s rotorhead, finetuned the adjustable three-bladed propellers, and prepared for the tests ahead. Lots of supporters drove out to watch or assist us, and a couple of enthusiasts arrived in their private planes.

All went as planned as Mark put the Ikenga 530Z through its ground handling tests. Then he began to attempt short hops along the runway to assess how the aircraft was responding to the high crosswind. The morning was long and he was careful. I was feeling very uneasy heading into the early afternoon knowing that, at some point, Mark would lift off in my dream creation. Concerns arose for his safety and
questions about my having addressed all design/safety/weight and balance objectives successfully were playing havoc on my emotions; however, this all vanished quickly.

Immediately after his first afternoon taxi run Mark gave a thumbs up, and we all knew that this was the moment of truth . . . he opened full throttle and sped forward with a high-pitched roar as the rotor quickly reached flight rotation and the Ikenga 530Z lifted off and vanished in the distant sky; only the sound of the Suzuki engine echoing like a bee in the distance. At first there were no words among us, simply a feeling of amazement at this accomplishment . . . then shouts of joy by all who were present, and big hugs all around. We could now and again see the aircraft as a speck against the distant clouds, or Mark would fly by at low altitude and then climb out in a different direction. He flew for a long while and finally landed to a welcoming celebration.

The week following this flight, we gave a demonstration at the Santa Fe Airport for the local and national television networks, then immediately headed off to debut the Ikenga 530Z at three airshows and to welcome the awards received at each: The Grand Champion Rotorcraft Award at the Albuquerque, New Mexico International Air Show; Best New Design In Rotorcraft Award at the PRA National Air Convention in Middletown, Ohio; and our team’s biggest surprise, The Reserve Grand Champion Award at the EAA Osh Kosh International Air Show in Wisconsin. These successes led to great opportunities, including a commission from Sumitomo Heavy Industries of Japan for the development of two Sumitomo Autogyros, and the debut of the Ikenga Cygnus 21 P2 Autogyro at the Skysports Japan Air Show in November of 1989. Soon thereafter the Ikenga joined the collection of the Smithsonian National Air and Space Museum in Washington, DC. It is a great honor that the Ikenga 530Z has found a home at the Smithsonian.

8. As an African American designer, how does it feel to have the Ikenga 530Z in the permanent exhibit at the Smithsonian and in terms of representation how does it inspire young people of all backgrounds?

I feel a great honor that the Ikenga 530Z has found a home at the Smithsonian and a personal joy and triumph that, as a self-taught innovator, this is the first aircraft in their collection built by an artist-designer from the African diaspora. Since the successful flight of my aircraft, I’ve facilitated creativity workshops for students and teachers at the Smithsonian, and shared my story with students of all ages, researchers in corporate settings, and aviation organizations. My creative gifts have touched people of all cultures.

9. Do you have any advice or encouragement for those people (some of whom might be my students at KNUT) about designing aircraft?

Yes . . . the very nature of our terrestrial technology, about what an aircraft is, is changing before our very eyes. Whatever your students’ passion is, be it technology, the arts, or the sciences, how he or she applies their creative gifts and abilities towards the survivability of our species as a global family is the task at hand; at least in my belief arena.

With this in mind, I would like to see more student dialogue regarding the foundational moral ethic that we each personally embrace, so as to assure our continuance as free-spirited, gifted, and compassionate creators . . . authentic communication of the highest order is a key to equilibrium.

As Artificial Intelligence proliferates against a backdrop of harsh environmental and social/cultural challenges, and Corporate Techno-Feudalism becomes a controlling influence impacting our
socio-economic reality worldwide, I’d value hearing from students on this topic. How do they and their peers understand and address the great complexities in their unfolding world, locally and globally?

I believe that the gifts and talents of your students (we are all students/teachers) will blossom as they define for their generation the ways to address a pivotal question: “Who are we becoming as a global species in metamorphosis?” This is how I would form words of inspiration, inquiry, and insight to elicit meaningful conversations with students, peers, and my brothers and sisters in general. Aren’t compassion, empathy, kindness, forgiveness, and harmony some keywords on this quest?

In Love, Light, and Encouragement, dwij David Gittens

Addendum: Following the success of the Ikenga 530Z the Ikenga Cygnus series of prototypes was developed. The Cygnus 21 (below left) for sports aviation enthusiasts and the Cygnus 21-TX (below right) a proof-of-concept aircraft for flying doctors in rural communities.
Links:

Ikenga 530Z first test-flight: https://youtu.be/65GTrbxR2hY
David's projects page: https://www.dwij.org/about_us/dwij_projects.htm
Smithsonian National Air and Space Museum: https://airandspace.si.edu