Introduction to Hang Gliding and Paragliding

- Ginny Farnsworth
- Hang Glider, Paraglider, Sailplane Pilot

Hang Gliding on Mt. Tam

- Courtesy of Marin County Hang Gliding Assoc.

Paragliding in Pacifica

Courtesy Merlin Flight School,
San Anselmo, CA

Soaring Flight

Since the dawn of time,
Man has looked up in awe
To watch the birds -
Soaring and dancing on the winds…
And wished he could emulate them.

Author Unknown

Hang Gliding & Paragliding

– Forms of aviation that come closest to birdlike flight

Brief History of Foot Launched Flight

- Pioneers of flight
  - Mythical characters of Icarus and Daedalus
  - Leonardo Di Vinci
  - Octave Chanute
  - Sir George Cayley
  - Otto Lilienthal
  - John Montgomery
  - Orville and Wilber Wright

Rogallo Wing

- Francis and Gertrude Rogallo
- Experimented with design and construction of kites in the 1940's and 50's.
- Patented several designs.
- Initial design envisioned to be reentry vehicle for NASA.
- Vision adapted over time, design became the basis for today's hang gliders.

Rogallo Wing

Birth of Modern Hang Gliding

- Bill Bennett, Bill Moyes, water skiers/kiters, towed Rogallo wings aloft from boats in Australia in the early 1960's.
- Dave Kilbourne, Australian water skier/kiter, drove the boat for the Moyes/Bennett operation, envisioned enlarging the kite and foot launching from a hill.
- Dave foot launched a Rogallo Wing in Coyote Hills, along the San Francisco Bay in the fall of 1971.
- Credited with first foot launched flight of the Rogallo wing.
- Bob Wills soared a Rogallo wing for 8.5 hours in 1973.
- The rest, as they say, is history……

Hang Glider or Paraglider?

- Many similarities.
- Just as many differences!
- Often share the same thermal or ridge.
- Both can soar aloft and fly distances of 100 miles or more.

Sharing the air

Hang Glider

- Weight shift controlled flex wing glider.
- Internal aluminum frame.
- Weight varies, approximately 70 lbs.
- Folds into bag approximately 12 inches in diameter, 20 ft. in length for transport/storage.
- Requires assembly on site.
- Pilot flies prone in a harness attached to the glider.
- Pilot controls speed and direction by moving body.

Hang Glider Transport Vehicles

- Mt. Tam, Marin County, California

Arrival and Set-up

- Elk Mountain, Mendocino County, California

Hang Glider Set-up Area

- Mt Tam, Marin County

Advantages of Flying a Hang Glider

- Hang Gliders are somewhat faster.
- Have flatter glide angles.
- Capable of flying in higher winds.
- Greater speed capability.

Hang Glider Certification

- Hang Gliders are certified by the Hang Gliders Manufacturing Association (HGMA)
- HGMA is an international organization which administers standards for airworthiness for Hang Gliders
- Testing includes:
  - Vehicle tests for strength and stability.
  - Flight tests for performance, stability, handling.

Vehicle testing of Hang Gliders

- http://www.hgma.net

World Distance Record in Hang Glider

- Pilot: Manfred Ruhmer of Austria
- Distance: 435 miles
- Flight Location: Zapata, Texas
- Date: July 17, 2001

Paraglider

- Aerodynamically controlled with toggles (brakes) attached to trailing edge of glider.
- Frameless soaring craft – ram-air canopy.
- Folds into backpack bag.
- Weighs approximately 15 lbs.
- Requires no assembly.
- Pilot flies seated in harness attached to glider

Paraglider Transport System

- Pilots hiking out from the training hill at Sand City

Advantages of Flying a Paraglider

- Take off and land in smaller spaces.
- Easier to learn to fly.
- Economical.
- Portable – more site access.
- Launches, lands, flies slower, turns a tighter radius, maximizing lift.
- Out climbs other forms of aircraft.

Paraglider Certification

- DHV is certifying agency
  - German Hang Gliding and Paragliding Federation
- International organization which administers standards for airworthiness for paragliders and hang gliders.
- Testing includes flight testing for stability, handling, performance.
- Approves manufacturers and maintenance organizations for compliance with standards and regulations.

DHV

- Information regarding safety and airworthiness standards for paragliders
- Deutscher Hangegleiter Verband
- http://www.dhv.de/typo/DHV.23.0.html

Paragliding Construction

- Top and bottom surfaces are connected by ribs
- Rib shape similar to aircraft wing cross section
- Rounded at leading edge, tapering to pointed at trailing edge
- Form a wing that is rounded on top, flat on bottom
- Ribs connect top and bottom surfaces to form cells.

Ram – Air Concept

- Cells are open in front, shape is defined by rib design, closed at trailing edge. Some have internal openings that allow air to move between adjacent cells.
- Forward motion fills cells
- Wing stays rigid due to lack of escape route for the air.

Paragliding vs. Skydiving Canopies

- Paragliders have 40 – 80 cells.
- Paragliding canopy is elliptical.
- Shape of airfoil is designed to create lift.
- Fly efficiently

- Skydiving canopies have 7 – 9 cells.
- Skydiving canopies more square to rectangular.
- Shape of airfoil designed for descent.
- Fly less efficiently

Learning to Fly Paragliders and Hang Gliders

- Schools and instructors are certified by the United States Hang Gliding Association.
- The United States Hang Gliding Association (USHGA) is the national organization for hang gliding and paragliding.

USHGA Structure and Purpose

- Nonprofit membership association for pilots and HG, PG enthusiasts.
- Provides pilot rating program.
- Provides structured instructor training, certification, and recertification programs.
- Provides training structure for tandem flight and aerotowing.
- Provides local club affiliation for the benefit of negotiated site insurance coverage.
- Publishes national magazine for flying, product and safety information.
- Provides third party and participant liability insurance coverage for members.

USHGA Benefits for Pilots

- Maintains membership in FAI for records and competition flying.
- Liaison with FAA, eliminating the need for FAA licensing.
- HG and PG ratings are issued by USHGA based on USHGA Instructors and Observers witnessing completion of the required rating tasks.
  - USHGA part 104 – Pilot Proficiency System
- Structure and support for safety related activities, accident review, etc.

USGHA
United States Hang Gliding Association

- National association for both Hang Glider and Paraglider pilots.
- Sister association to SSA.
- http://www.ushga.org

Flight Instruction

- USHGA certified School.
- USHGA certified instructor.
- Appropriate beginner rated equipment.
- USHGA approved teaching method.

- Level of experience of instructor and school.
- Safety record.
- Instructor/student ratio.
- Access to appropriate site for progression of skills.

To Check it Out

- Take an introductory lesson.
- Experience sensation of personal flight.
- Approximately 4 – 6 hours of instruction.
- Equipment included.

Entry Level Courses

- For those who wish to become competent.
- Include:
  - Instruction
  - Equipment
  - Ground school
  - Formal syllabus
  - Log book
  - Training manuals and more

Learning Process

- Launching, landing.
- Shallow and steep turns.
- Speed control.
- Wind and weather analysis.
- Flight planning and execution.
- Kiting.
- Reverse Launches.
- And much, much more…….

Paragliding Students

- Group lessons allow you to learn things you wouldn’t think of asking.
- One on one instruction even in group.

Reverse Launching

- Courtesy of Merlin Flight School
  - San Anselmo, CA

Tandem Instruction

- Certified tandem instructor.
- Certified tandem equipment.

Tandem Instruction

- Instructor does take-off, landing, critical maneuvers.
- Student flies good portion of flight.

Solo Flight Instruction

- Gently sloping launch.
- First flights close to ground.
- Instructor at your side.

Flight Instruments

- Altimeter
- Variometer
- Radio
- GPS

Flight Computers

- Altimeter
- Variometer
- GPS
- Thermometer
- Integrated system

- Wind speed and direction.
- Flight time.
- Bearing and track.
- Direction to best climb.
- L/D ratios.
- HG to PG conversion.
- Height and distance to destination.

Communications

- Ham Radios
- Repeater transmission of messages.
- FCC amateur Radio license

Safety and Risk Management

- Pilot training
- Equipment certification
- Pilot judgment
- Advanced instruction
- Annual USHGA official Accident Review

Resources