Rock 'n Roll over Central California **Emile Niu**

One of my favorite classic movies is a 1970 feature "Tora! Tora! Tora! One scene depicted an ab-initio student "Jimmy" cruising over Oahu, Hawaii with an instructor on a yellow biplane which encountered formation of Nakajima Torpedo Kates on their way to bomb Pearl Harbor. While this action film tried to instill some humor on the attack, the yellow bird has inspired my nostalgia on biplane. I recently went to a flight school at King City, Central California to do some flight training on Pitts, a biplane. This is all about spins, diving plunging toward the Earth, pulling -2 to +4 Gs and rolling inverted and upside down which will send adrenaline flowing and blood pumping. It is a lot of hard work with body endurance but also an opportunity to stretch your skills with exhilaration from the first flight.

Hangar is "AAA" clean and feels like a performance aircraft showroom

The flight school is sponsored by Tutima, a German watch company and run by the renowned "Team Oracle" Air Show pilot Sean Tucker. The flight school is unique in the sense that it is one of the few flight schools in the world that focus only on teaching competition aerobatics and safety training. If you are in for a rating, this is probably not the place to be. Here, students have a choice of doing training on Pitts S2-B&Cs and Extra 300L. The Pitts S2s have various models but in general, the plane is few feet shorter than a C152 and empty weight around 1,250 lb but equipped with a relative powerful engine at 260 hp and roll 240 degrees per second. My instructor here is Ken Erickson, the chief pilot for the school and an Air show pilot. There are other young talented instructors such as Ben Freelove which ranked 9th in the 2010 FAI Advanced World Aerobatic Championship at Radom, Poland. I have requested

for Ken to instruct me as he is being regarded as an expert on Pitts and also has inspection authorization on power plant and airframe which can certainly enhance my all around knowhow.

The routine here started with pre-flight, parachute/jettison briefing and re-fueling. Wearing chute is the same practice in Hong Kong and the idea of using it can be terrifying, but you can think of it as wearing a live vest on a regular flight over the water. It may seem trivial to many pilots on re-fueling before the flight, but for the Pitts, a re-fuel is necessary for every flight with total usable capacity at only 23 US gallons. At takeoff, the fuel burn is 25 US GPH and average 13 US GPH at cruise. Hence, this ship would not be a popular cross country flyer and the total endurance is typically within 1.5 – 2 hr depending on what you are doing. If we set this aircraft in Shek Kong, you can make it to and back from Sector while doing a half hour work in MIRS Bay, but it would be physically impossible to meet the Club's 3 hr fuel reserve requirement. The Pitts look is definitely sharp and awesome, in some cases being viewed as a romantic aircraft. However, this aircraft is far from ideal to take your family and friends up for sightseeing. Seating is uncomfortable with cabin width at 2 ft 4 in, no luggage compartment, very noisy even with an active noise reduction headset; instrumentation is down to the minimum with no heading indicator, artificial horizon or turn coordinator. A waiver from CAD would be necessary to fly in Hong Kong. In addition, with its short wing spans, the aircraft has poor aspect ratio and one cannot expect meaningful glide performance in the event of a forced landing. To land the aircraft, a tight circuit would be flown and Base turn will be initiated after passing abeam the beginning of the Rwy 11 (sounds familiar?) at 800 ft AGL which will position the aircraft on short final with an approach speed of 110 mph. In short, the aircraft is only fit for the purpose it has been designed for, i.e. aerobatics; to fly this aircraft for other purposes can be a challenge.

To start the aircraft, all procedures for the aircraft have to be memorized as the house rule here is no loose articles including checklist. Taxi on the ground would be weaving left and right halfway on the taxiway since the front view is being obstructed by the nose high cowling which is not unusual for a tail-dragger, but the Pitts nose is higher compare to other tail-draggers I have been on such as Decathlon. While King City would appear to be in nowhere land, however, that is exactly what makes this place perfect to pursuit aerobatics with field elevation at 370 ft and approved practice field within 2 miles from the airport. This distance would be similar to leaving Shek Kong circuit for Kardoorie Gap. This is an airspace wonderland which you can do anything as long as you stay below 6,000 ft where transit traffic takes place and control by Oakland Center. Once you depart from the airstrip and climb up to an appropriate altitude, you can start the exercise. At the end of the slot, simply descend to Downwind and land. In short, the flight time on the logbook is all aerobatic and negligible time spent on cruising back and forward to the airport. As the instructor Ken puts it, there is no need to practice straight and level flight, how I wish we have a similar adjacent airspace in Shek Kong.

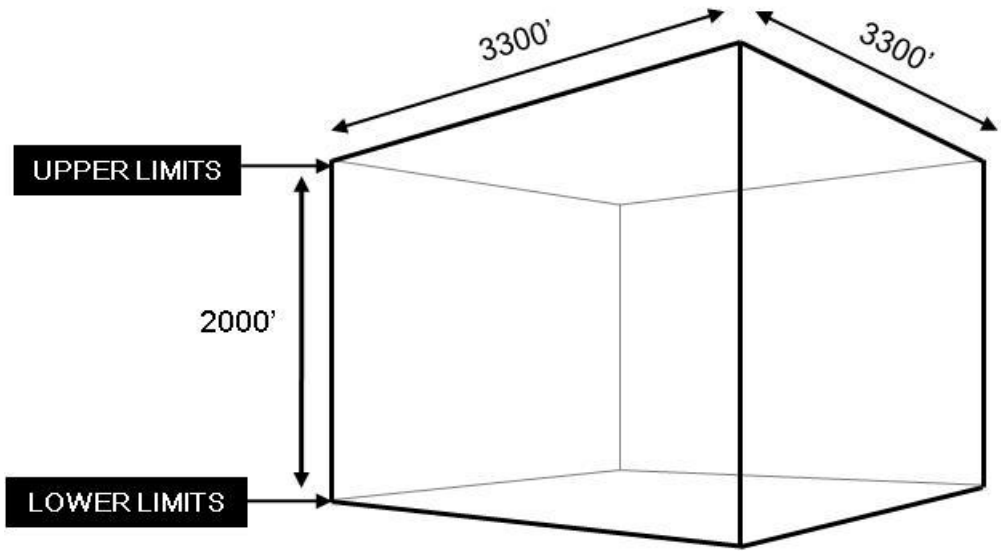
On the first flight, as the airplane got up to 4,000 ft MSL, the sequence started out with “Frame of Reference”, an exercise which draw shapes in the sky with the nose as a pen. These shapes included square, diamond and then progressively to circle which can help to enhance attitude control skills. The next exercise was the Harrier Pass (to simulate Harrier Jet vertical landing) which was one of Sean Tucker’s favor performance at various Air Show. Typically, the attitude is being raised to 70^{o} while holding the wings level by rapid rudder coordination. We used 60^{o} pitch to work on this exercise and as a helicopter pilot, this maneuver appears more like a quick stop to me, pitching up and then coming into a hover state. With minimum relative air flow, all the P factor, slipstream and torque coming into play, rudder coordination became tap dancing.

Competition turn is 60^{o} bank and with same roll rate at entry and on roll out. Visual cue with the strut bar against the horizon is the only choice since there is no attitude indicator on the panel. Spin recovery is an exercise being emphasized here as unusual attitude will result from a failed maneuver and pilot must be sharp on recovery skill. In fact, practicing spins can take the fear and mystery out of the maneuver and increase confidence. While doing upright accelerated spin by adding power and pushing the stick forward is nothing new to me, flat spin and inverted spin was something I have not tried previously. An illustration on the flat spin would be a scene depicted in the 1986 TopGun movie where the F-14 Tomcat flown by Tom Cruise got caught in vortex of the preceding F-14 which resulted in a spin with centrifugal force. To break the spin, release the rudder, hold the stick back and apply full in spin aileron. The spin can be stopped by this technique without the opposite rudder. Inverted spin was also a new experience for me and the entry was from inverted straight and level position. To enter, throttle back and push stick full forward to slow the Pitts to 75 – 80 mph. Full right rudder to spin and check throttle back. Full opposite rudder (left) to break the spin and stick back to neutral. As the aircraft dives, pull gently and immediately squeeze the abdominal to alleviate effects of positive Gs as this is a transition from negative 2G to positive 3-4G. The positive G force reverts the direction of the blood flow pushing blood away from the brain which can cause loss of peripheral vision.

Primary exercises for the basic program included Immelman, Barrel Roll, Ballistic Roll, Slow Roll, Hammerhead, Cuban 8, reverse Cuban 8 and Humpty Dump which are exercises being practiced in Hong Kong. Other maneuvers taught were Tail slides (both back and forward), Split S, Lomcevak, Vertical Roll, Shoulder Roll, Snap Roll and more subject to G tolerance of the student. In Chinese, we have a jargon describing aerobatic flight as tumbling the aircraft (翻筋斗). Lomcevak is a cool maneuver which is an exact match of this jargon, using the nose as the head and tail as the feet, the aircraft is being tumbled upside down continuously. The entry for this maneuver starts by rolling the aircraft 90^{o} to the left and then simultaneously pushes

the stick full forward to the left and full right rudder. Depending on how quick you push the stick forward, the G load ranges from negative 2G to negative 4G.

Towards the end of the program, maneuvers are being put together to fly the 2011 Sportsman known sequence (demo on http://www.youtube.com/tutimaacademy) and freestyle sequence as planned by the student. All exercises focus on certain standard to make the maneuvers look good to the Judges on the ground. For example, the Loop requires constant radius, constant heading and wings level throughout the maneuver and the altitude for entry and completion has to be the same and within the aerobatic box. The aerobatic box is a 3,300 ft by 3,300 ft (1,000 m by 1,000 m) square with a depth of 2,000 ft between the bottom and upper decks. The lower deck for the Sportsman category starts at 1,500 ft AGL which is what I am learning. As there is not much room in the box, one has to be on top of position awareness with active speed control. For example, on recovery from a competition spin pointing straight to the ground, I was taught to add power on the way up and be aggressive on recovery in order to achieve no less than cruise speed of 160 mph by straight and level so that the next maneuver can be entered. At cruise speed, the Pitts has about 12 sec from one end to the other. If time is required to build up airspeed after recovery, the aircraft could be out of the box.



Aerobatic box is the area in which aerobatic competition take place. Pilot has to stay within lateral and height limits of the box. Penalties apply on boundary infringement and bottom deck is strictly enforced with the lowest limit at 328 ft AGL for Unlimited.

As I finished up, I was told the program has been restructured and shortens to 5 days which can help to provide more flexibility on schedule for overseas students where enthusiasts draw from Europe, South America, Japan and with me from Hong Kong.