



XRW: Discussion and Guidelines

Summary Outline

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Disclaimer

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This presentation is not a do-it-yourself guide to XRW skydiving but should only be used while under the supervision of suitably qualified instructors or coaches. Individual skydivers should check the information in this document and assess the risks involved before carrying out any of the procedures or manoeuvres described.

XRW - fundamentals

Summary of the session

What is XRW?

XRW stands for eXtreme Relative Work, or in less wanky terms 'Cross Relative Work' involving the creation of mixed formations of canopy pilots and wingsuit flyers. Originally starting out as a stunt type activity, over the last few years this has become more accessible and more people are starting to see this as an emerging discipline in skydiving

Why are we having a session on this now?

The last few years has seen significant development of the performance of new parachutes and wingsuits that has made XRW significantly more accessible to skydivers. Consequently there is now a greater number of people that can/are doing XRW jumps. After last years funny farm it was suggested that we should start talking to the APF about this as a discipline and what this could mean in the wider skydiving community

What are the goals of this session?

The goals of these sessions are to provide an overview of XRW, share some of the important safety aspects and to discuss possible approaches for XRW in Australia. While it is early days for XRW, there are considerable dangers involved and we want to discuss the best way forward and to receive feedback on possible approaches

Gear that is required

Cross over with canopy piloting

Getting in the ball park:

Some wingsuits and parachutes have a common operating range (vertical descent and horizontal speed) that allows both disciplines to fly together. There are a number of wingsuits that can achieve 30-40mph descent speeds which can match a high performance canopy flying at full drive. This represents a common flight mode, that is at the limits of flight performance that both wings can achieve.

Only the highest performance parachutes are able maintain a constant descent at these speeds. Use of a RDS is mandatory, slicker clothing also helps maintain a faster forward speed (better range for WS). When conducting XRW dives, we would typically look to load the wing above a wingloading of 3:1. On my Petra 67, we have a vertical descent of over 35mph (20m/s) and a forward speed of something like 70-75mph.



Gear that is required

Cross over with canopy piloting

Suitability of parachutes for XRW has three main interlinking criteria; wing type (trim), size and wingloading. Together these factors determine the descent rate and forward speed of the canopy. As we are operating at the limit of the performance of the wingsuit flyers, the faster the canopy can fly, the more range the ws pilots will have.

Canopies listed in terms of most appropriate for XRW flight: Petra, Peregrine, Leia, Valkyrie, Velocity, JVX, etc. The Petra has been the preferred wing and has the steepest trim while the JVX is the flattest flying wing. While it is possible to use a JVX for XRW, the wing loading needs to be significantly higher to match the flight envelope (e.g. a Petra 67 @ 2.9 descends slightly faster than a JVX69 at 3.5).

Sizing and wingloading also effect speed so that smaller the better. While it is possible to do it on canopies as large as 79 square feet, smaller canopies are preferred, 70 feet or smaller is a good benchmark depending on canopy selection and wingsuiter ability. Canopy trim is probably the most important attribute, as increasing wingloading has small incremental gains to descent speed.



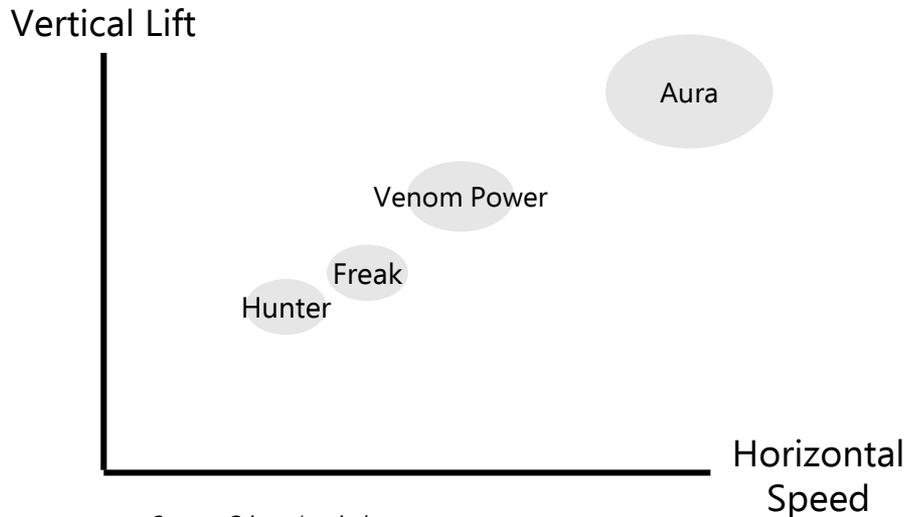
Using the right equipment

Wingsuit

What is appropriate

Not as clear cut as the canopy side of things as is heavily dependent on the skill set, size and relative wingloadings of the canopy pilot. This is further complicated by the need of the wingsuiter to match the relative forward speed of the canopy and generate the required lift. So the wingsuiter needs to work to manage their forward speed and lift

*Totally made up indicative graph



Source: Griggsy's mind



Using the right equipment

Wingsuit

What can be used:

Generally speaking, we are currently using/recommending smaller wingsuits than we have traditionally used. The new generation of wingsuits (e.g. Hunter/Freak) offers enough performance while is relatively easy to use compared to a suit like the Aura. While the Aura has a significantly larger lift potential, it is also significantly more challenging for the ws pilot, being twitchier and with a significantly higher forward speed.



The right people and skillsets

Discussion on experience levels

This is the hardest to quantify; as the suitability is based on skill set and the judgement of the pilot operating in a challenging environment

From the canopy piloting perspective:

- Has been part of an Australian CP team / competed at a world level?
- Comfortably and consistently land a canopy at a wingloading of 3+
- Have 2000+ skydives?
- Some CRW/flocking experience – can comfortably hold heading and slot
- Ability to assess weather conditions, ability to navigate to DZ, calm under pressure
- Excellent heading control while flying highly sensitive wings (no turning or sliding)
- Wont wig out when it gets exciting

From the wingsuit perspective:

Harder to quantify as development of wingsuit performance has meant suitable suits are becoming smaller as overall performance increases

Considerations:

- **Recommendation** – based on assessment of a suitably experienced wingsuit coach that is XRW experienced
- Flocking experience (wingsuit crest+)
- Experience in three dimensional flight
- At least 100+ jumps in suit
- Ability to stick to a plan and not push 'bad angles'

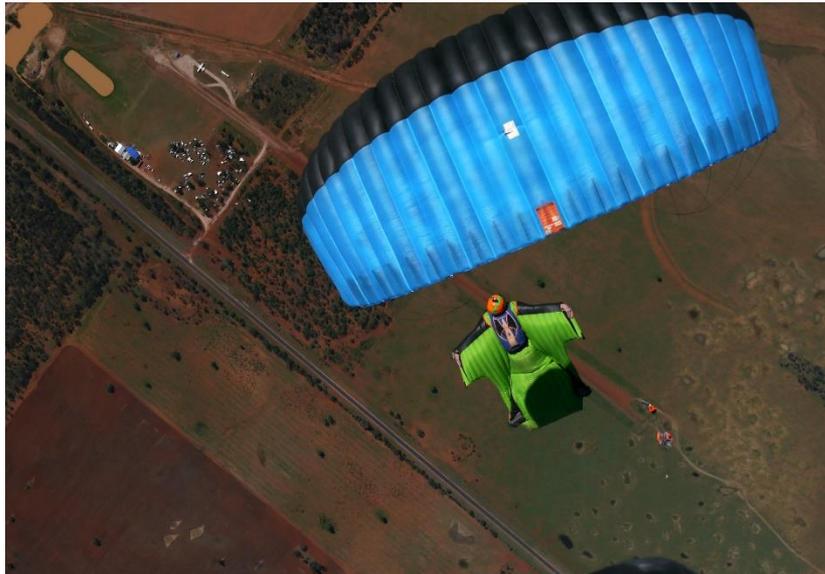
Exit techniques / intercepts

Key thoughts

There are a number of different ways that you can exit to do XRW, there are several that work. The important thing is assess is what makes the most consistent and safest approaches for all pilots.

We generally do the following as it means that you:

- Have the same jump run (happier operator)
- Are upwind of the target (cutaways and less chance of messing up the winds/navigation)
- Are clear of other traffic on load (you will pass tandems on landing / some sports jumpers if you are doing dynamic XRW)
- Is less work for the WS pilot as they don't need to fly as much when the CP is setting up
- Is more tolerant of 'erratic' openings for the CP (and the WS can see and deploy early to chase the canopy if necessary)



Exit techniques / intercepts

Outline

- Exit after all other groups, exit point calculated based on winds aloft. Usually in the region of 2NM away from DZ with light headwinds
 - CP exits first and takes a 3-7 second delay
 - Plane starts a slow turn to the left (covers roughly 45-90 degrees), CP follows the plane on opening while stowing the RDS.
 - WS pilot exits approx 10-15 seconds after the CP (depending on aircraft speed and CP delay), once the WS exits, CP commence slow turn to the left of approx 90 degrees to head back to the drop zone (putting the WS in the right rear quadrant).
 - CP Finish stowing RDS, pop brakes and navigate back to DZ
 - WS to fly to a predetermined side of the canopy formation. Set up far back, only approach when canopy has stowed RDS and is in full flight (learn the look of a canopy in brakes).

Figure 1.

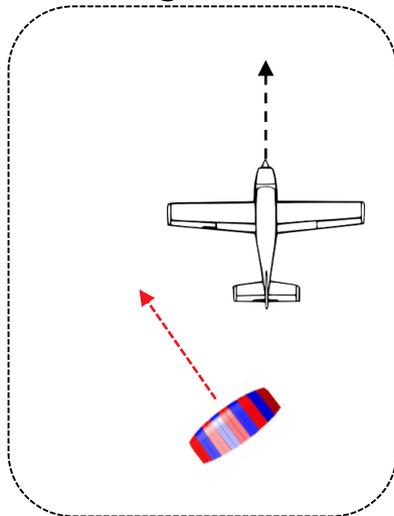


Figure 2.

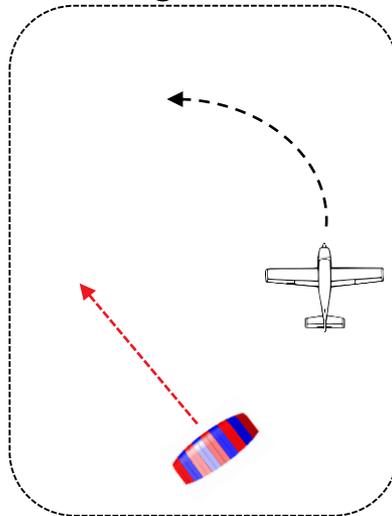


Figure 3.

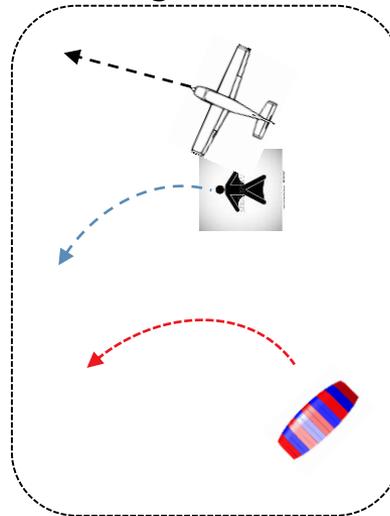
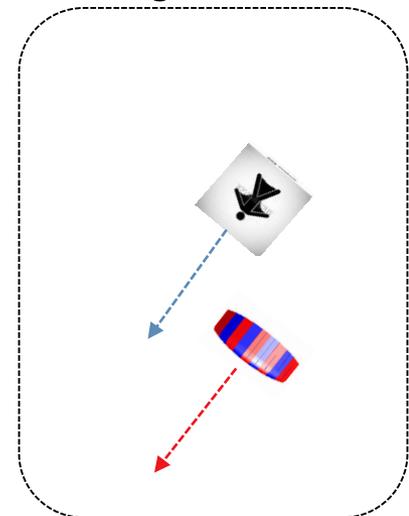


Figure 5.



Safety Considerations

Some other things to think about

- Approaches should not be made from head on or at greater than 45 degrees as the closing speed is excessive
- WS should fly below the level of the CP shoulders, any higher and they risk potential canopy/line collision with catastrophic potential
- Any sort of movement/manoeuvring should be agreed prior with relevant signalling
- CP think up for any sort of safety or evasion manoeuvre, WS down
- Any docks should aim for no tension style docks (surf or hand). Should not be made in close proximity to other flyers due to the risk of heading change
- WS lateral speed is very fast. WS also tends to slide a lot more than canopy will during a turn (don't aim at me or slide into me with momentum!)
- Initial jumps should only consist of one canopy pilot and one wingsuiter
- Before attempting should jump/talk with a suitably experienced pilot
- If you lose sight of the canopy during the intercept, have an agreed heading/ flight plan to fly to avoid possible collisions or off DZ landings.
- Wingsuit pilots attempting to join/form an XRW formation for the first time, should only do so under the supervision or guidance of an experienced XRW wingsuit pilot.
- A clear flight plan should be made and approved by the DZSO
- If the canopy guys cut away, be a mate and deploy off door and chase canopy down.



Additional Canopy Considerations

Some more things to watch out for

- Don't take off your chest strap, sometimes the WS will burble you and make your canopy stop flying
- Stow toggles during flight as they can flip through line group. This is especially true when doing any sort of dynamic flying
- Don't go overboard with weight, think of your reserve and what it might be like opening at terminal at 14,000 feet (higher loading and airspeed)
- Line wear is likely to be higher, monitor line condition
- Select landing area with care; how comfortable are you in that landing area with extra lead and smoke canister strapped to your leg? e.g. not smooth landing areas can become a hazard in themselves
- While trim tabs make a canopy fly steeper they are highly recommended against – distorts the wing and increase chances of collapse with wake turbulence. Not to mention more fun mals and another possible failure point – if you are thinking of doing this, don't. Get a better canopy
- What is the plan if you have a mal? Will the WS follow your gear for you?
- Will you do your normal landing approach or something different

Progression

Thought process on first jumps and beyond

- Aim to work on controlling proximity and maintain flight profile more than docks
- Take time building up and doing docks – heaps of working time, good docks much better than rough ones that possibly change heading
- Remember it is a 3D moving intercept, much harder than other disciplines. Getting this consistent means that you can shorten the gap between exits.
- Build up (and walk out) exits to maximise consistency of exit and intercepts
- It helps if the WS counts out the exit for consistency
- Check weather conditions before you jump and alter your spot accordingly. If you are doing a dynamic jump alter spot to account for movement
- Flightsight data can tell you whether you are flying within the flight envelope to do XRW
- Talk about what you would do in emergency situations and have plans for gear failure, landing off, etc
- Slicker clothing will help maintain a faster forward rate, assisting the WS folk
- Experiment with different docks, intercepts and flight modes
- Don't start playing with dynamic flying till you have mastered static and have many jumps and great understanding with your team mate
- **Don't go in**



Why are we running this session?
Because some people make things overly exciting



Why are we running this session?

Recap

The information that we have run through is the background / briefing information that we are thinking of sharing with the wider community;

There are a few questions that need to be resolved:

- Any questions on the content?
- What do we think is an appropriate level of experiences on both the wingsuiter and canopy pilot?
- What is the best way to communicate this to wider community given the small percentage of people that are able to do this?
- Is there any more information that would be helpful to share with drop zones?
- Is there other information that we should share with skydivers? What would be the best way to share this information?



Other links
Hyperlinks:

Examples of footage:

- Link1

Thanks!

