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Scholarship 2025

93602 Design and Visual Communication

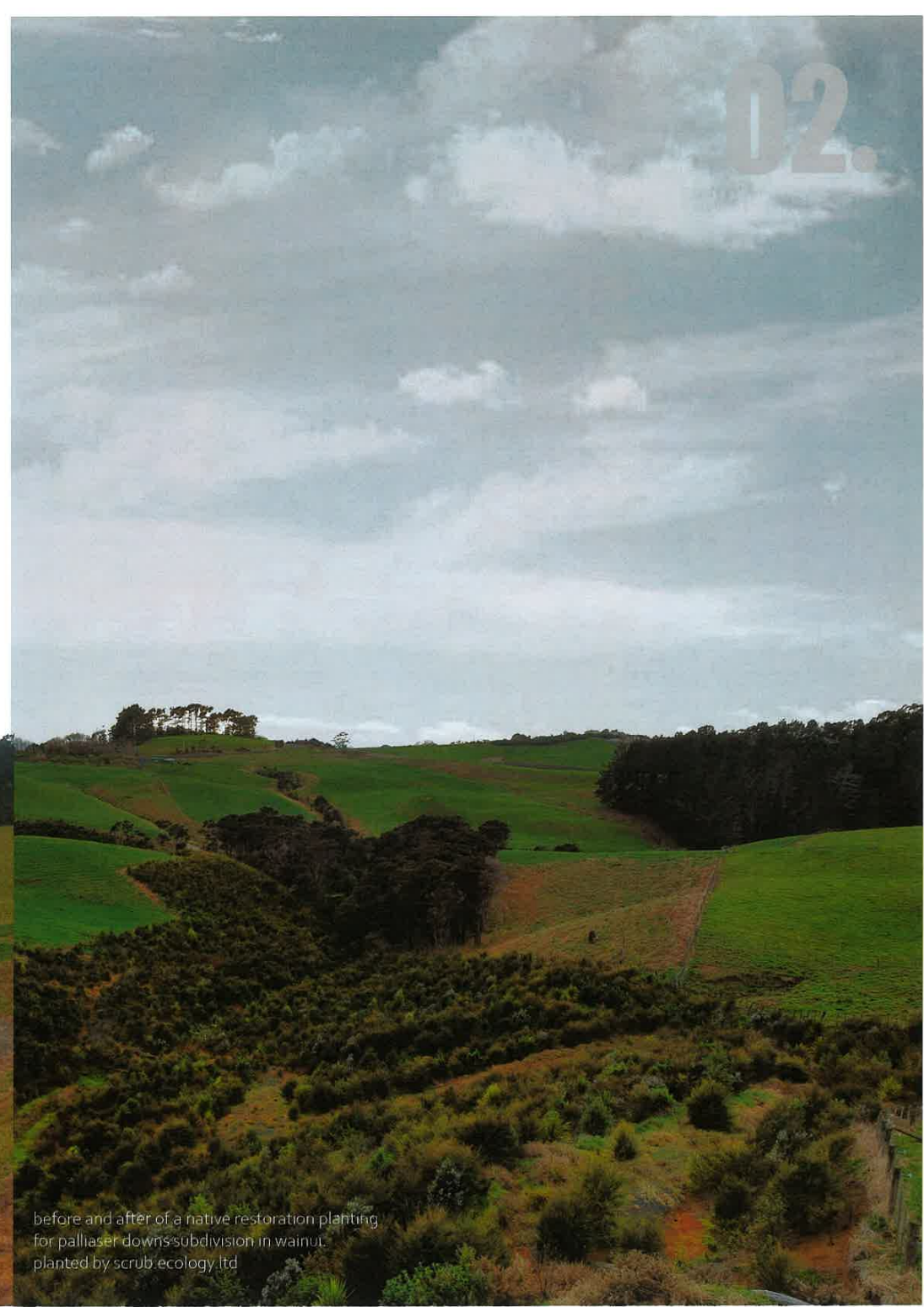
TOP SCHOLAR



CONTEXT

OPENING STATEMENT

I aim to design a product
that can help with
native plant restoration for
remote and ruff terrain.

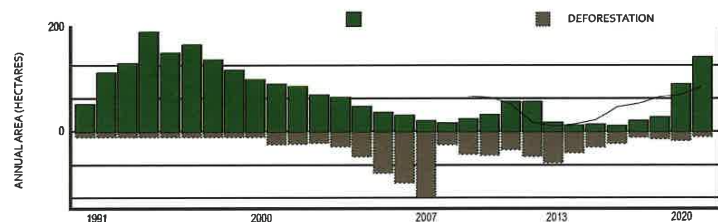


before and after of a native restoration planting
for palliaser downs subdivision in wainui
planted by scrub ecology ltd

02.

DEFORESTATION

OF NEW ZEALANDS NATIVE FORESTLAND



WHY IS REFORESTATION IMPORTANT IN NEW ZEALAND?

New Zealand has experienced significant deforestation since human settlement, particularly due to agriculture, urban expansion, and logging. While efforts have been made to restore native forests, challenges remain in replanting areas that are remote, steep, or difficult to access.

KEY REASONS WHY REFORESTATION IS CRUCIAL IN NEW ZEALAND

Biodiversity Protection: Native forests provide essential habitats for species like kiwi, kererū, and tuatara. Deforestation has contributed to habitat loss.

Erosion Control: Large-scale land clearing, especially in coastal and hilly regions, has led to increased erosion, affecting soil quality and waterways. Aerial seeding could help stabilize these landscapes.

Carbon Sequestration: Native forests, such as kauri, rimu, and tōtara, play a critical role in absorbing carbon dioxide and mitigating climate change. Reforesting cleared areas could help New Zealand meet its climate commitments.

CHALLENGES WITH TRADITIONAL REFORESTATION METHODS

Labor-Intensive & Costly: Traditional tree planting requires significant human labor, which can be expensive and time-consuming.

Remote & Inaccessible Terrain: Many areas in need of reforestation, such as the Southern Alps and parts of the North Island, are difficult to reach by foot.

Slow Reforestation Rates: Manual planting can only cover limited areas at a time, making it difficult to meet large-scale reforestation targets.

WHAT IS AERIAL SEEDING?

Aerial seeding is a method of dispersing seeds from the air, typically using drones, helicopters, or airplanes, to restore vegetation in areas that are difficult to access by traditional planting methods. This technique is particularly useful for reforestation efforts, erosion control, and restoring native plant ecosystems after deforestation or natural disasters.

HOW AERIAL SEEDING COULD HELP

Using drones for aerial seeding in New Zealand could provide a faster, more efficient, and cost-effective solution to reforestation. By automating seed dispersal, drones can reach remote or rugged landscapes where manual planting is impractical. Furthermore, drones equipped with AI and mapping technologies can ensure that seeds are planted in the most suitable locations.

TODAY'S FOREST COVER



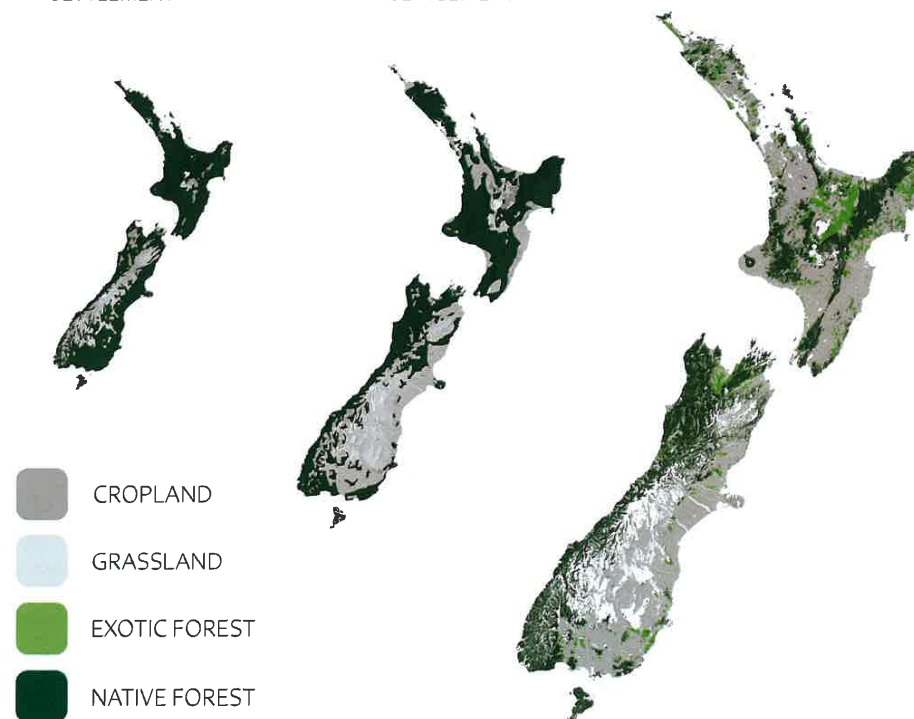
BEFORE POLYNESIAN SETTLEMENT



BEFORE EUROPEAN SETTLEMENT



CURRENT DAY



DEFORESTATION AND REFORESTATION IN NEW ZEALAND

Prior to human settlement, over 80% of New Zealand was forested, with only high alpine regions and the driest parts of the South Island lacking tall forests. The arrival of Māori settlers between 1250 and 1300 CE led to significant deforestation, primarily through the use of fire, reducing forest cover to about 50% by the onset of European colonization around 1840. By 2000, native forest cover had further declined to approximately 6.2 million hectares. As of 2020, New Zealand's forest cover stands at approximately 31% of its land area, encompassing both native and plantation forests.



THE SCRUB STORY

Founded in 2004 by ecologists Rodney and Jane Straka, Scrub was initially established as an environmental consultancy providing advice on rural subdivisions in the former Rodney District, with a small eco-sourced native plant nursery.

Located in Wainui, north of Auckland, the company has grown over the past 15 years, and now employs a team of 20 staff, offering clients a full range of ecology-based services to support farmers, developers, local authorities, and community environmental groups.

CO-FOUNDERS

Scrub is led by Directors Rodney and Jane Straka

Rodney Straka: Oversees the ecological and operational teams, ensuring an ecology-based approach to every project. He holds a Bachelor of Resource Studies majoring in forest ecology from Lincoln University and is a member of the Auckland Botanical Society and the New Zealand Ecological Society.

Jane Straka: Manages the native plant nursery, conducts seed collection for eco-sourcing, and supports. She has a Bachelor's degree in Plant Science and Ecology from Massey University and a Bachelor of Architecture (Hons). Jane is a member of the International Plant Propagators Society and holds a Level 4 advanced certificate in Horticulture (nursery production).

We are both innovative and practical in our approach to every project. We support our clients to achieve their commercial, environment and community goals in a way that makes a meaningful difference to the land being restored, leaving behind an ecologically sustainable footprint for future generations.



QUOTE FROM DIRECTORS

"Our planting crew is incredibly diligent and hardworking," say Rodney and Jane Straka. "Day in and day out, they brave tough conditions to get native trees in the ground. But at the end of the day, they're still human, and humans make mistakes. Sometimes, trees are planted too shallow, too deep, or in the wrong conditions, which can lead to poor survival rates. Other times, simple misjudgments in spacing or terrain can cause long-term issues that we have to correct later. While their dedication is unmatched, these mistakes create challenges that cost time, resources, and, ultimately, the success of a restoration project."



RESTORATION CREW

A dedicated **20-person** planting crew from Scrub Ecology Ltd specializes in restoring native ecosystems, planting an impressive **13,000 native trees each day**. Working in tough conditions, they navigate rugged terrain to ensure successful reforestation and biodiversity recovery. Their expertise and commitment play a crucial role in revitalizing New Zealand's landscapes and supporting long-term environmental sustainability.

MANAGERS

Kaicey Allison

Jake Moore

Thad Finch

2024 TOP PERFORMER

PLANTED **55,777**

AVG PER HR **105.19**

PLANTING HRS **530.75**

Kaicey Allison

30,000

MY SEEDLING POTTING STATS

Over a six the week school holiday, I planted approximately **30,000** native seedlings of various species for scrub in thier nursery. In addition to planting, I also facilitated the growth of many more seedlings by ensuring proper care and optimal conditions for their development



Kanuka, seedlings



PLANTING AT 44-20 ARONE WAY, WAINUI

4,000

MY PLANTING STATS

In 2025, I planted over **4,000** native plants of various species across various locations for scrub, with most of my work focused on a **wetland restoration site in Whangamata, Coromandel**. This project was crucial for improving **biodiversity, water quality, and ecosystem stability** in the area. Working across different terrains, I helped restore **critical wetland habitats**, which act as natural carbon sinks and provide refuge for wildlife. Being part of such a large-scale restoration effort has strengthened my commitment to **ecological conservation and sustainability**.



1,000,000

ANNUAL NATIVE SEEDLINGS
GROWN BY SCRUB

2,820,178

TOTAL NATIVE TREES
PLANTED BY SCRUB

Scrub produces **1,000,000** native seedlings annually, supplying large-scale restoration projects across New Zealand. With a total of **2,820,178** trees planted to date, the company is experiencing exponential growth each year, increasing its production and planting capacity to meet rising demand. As awareness of ecological restoration and carbon sequestration expands, Scrub continues to scale up operations, playing a key role in reforestation efforts. Their ability to grow and plant more trees each year highlights their commitment to environmental sustainability and native ecosystem recovery.

ESTIMATED CO₂ SEQUESTRATION

1
TREE OVER LIFE TIME

=



2,820,178
OVER 1 YR

=



62,000
TRANSATLANTIC FLIGHTS

2,820,178
OVER 50 YR

=



**TAKING 675,000 CARS
OFF THE ROAD FOR A YEAR**

Trees absorb CO₂ through photosynthesis, storing carbon and releasing oxygen to clean the air. Over its lifetime, one tree negates 1 ton of CO₂, making large-scale planting crucial for climate action. In one year, 2,820,178 trees absorb 62,000 metric tons of CO₂, equal to 62,000 transatlantic flights. Over 50 years, they capture **3.1 million metric tons**, like removing 675,000 cars for a year. As Scrub expands planting efforts, these trees will greatly impact carbon reduction and ecosystem restoration.



NATIVE PLANT SPECIES

These plant species are widely used by Scrub Ecology Ltd and other contractors for large-scale restoration due to their fast growth and support for natural regeneration. They include upper and lower canopy species, creating a diverse forest structure that enhances biodiversity. Many produce easily collected seeds, making large-scale planting more efficient. Additionally, they attract native birds, which aid in seed dispersal and support long-term ecosystem sustainability.

Mānuka, *Leptospermum - scoparium*

Seeds & Dispersal: Produces small, woody capsules that release fine seeds, dispersed by wind.
Location: Thrives in poor or disturbed soils, including scrublands, wetlands, and coastal areas throughout New Zealand.
Height & Ecological Role: Typically grows up to 4 meters. Supports ecosystems by offering habitat for insects, including bees (important for mānuka honey production), and acting as a nurse plant for forest regeneration.



Ponga, *Cyathea dealbata*

Seeds & Dispersal: Reproduces via wind-dispersed spores under fronds.
Location: Native forests, scrublands, and moist, shaded areas.
Height & Ecological Role: Grows up to 10m, provides understorey habitat, and supports forest floor biodiversity.



Kānuka, *Kunzea robusta*

Seeds & Dispersal: Produces tiny, dry seeds held in small capsules that release seeds, dispersed by wind.
Location: Found in a variety of environments, including dry scrublands, coastal areas, and regenerating forests across New Zealand.
Height & Ecological Role: Can reach up to 15 meters. Acts as a pioneer species in ecological succession, improving soil conditions and providing habitat for insects and smaller plants in regenerating forests.



Kauri, *Agathis australis*

Seeds & Dispersal: Woody cones with wind-dispersed winged seeds.
Location: Northern New Zealand, well-drained soils in kauri forests.
Height & Ecological Role: Grows up to 50m, forms upper canopy, supports diverse ecosystems.



Harakeke, *Phormium tenax*

Seeds & Dispersal: Long seed pods contain numerous flat, black seeds that are wind-dispersed.
Location: Thrives in wetlands, riverbanks, and coastal areas throughout New Zealand.
Height & Ecological Role: Can grow up to 3 meters. Provides habitat and nectar for native birds (e.g., tui, bellbird) and insects. Its dense leaves offer cover for wildlife.

Karamū, *Coprosma robusta*

Seeds & Dispersal: Produces small, orange-red berries that are bird-dispersed, particularly by native birds like kererū (wood pigeon).
Location: Found in lowland and coastal forests, scrublands, and regenerating bush.
Height & Ecological Role: Grows up to 6 meters. Acts as an important food source for birds and helps in natural forest regeneration as a pioneer species.



Tī kōuka, *Cordyline australis*

Seeds & Dispersal: Small, white berries, bird-dispersed by kererū and tui.
Location: Wetlands, forest margins, coastal areas, and open spaces.
Height & Ecological Role: Reaches 20m, offers nectar, shelter, and habitat for birds and invertebrates.



Pūrei, *Carex virgata*

Seeds & Dispersal: Small, dry seeds dispersed by water.
Location: Wetlands, stream edges, and damp areas.
Height & Ecological Role: Up to 1m, stabilizes soil, reduces erosion, and supports wetland wildlife.

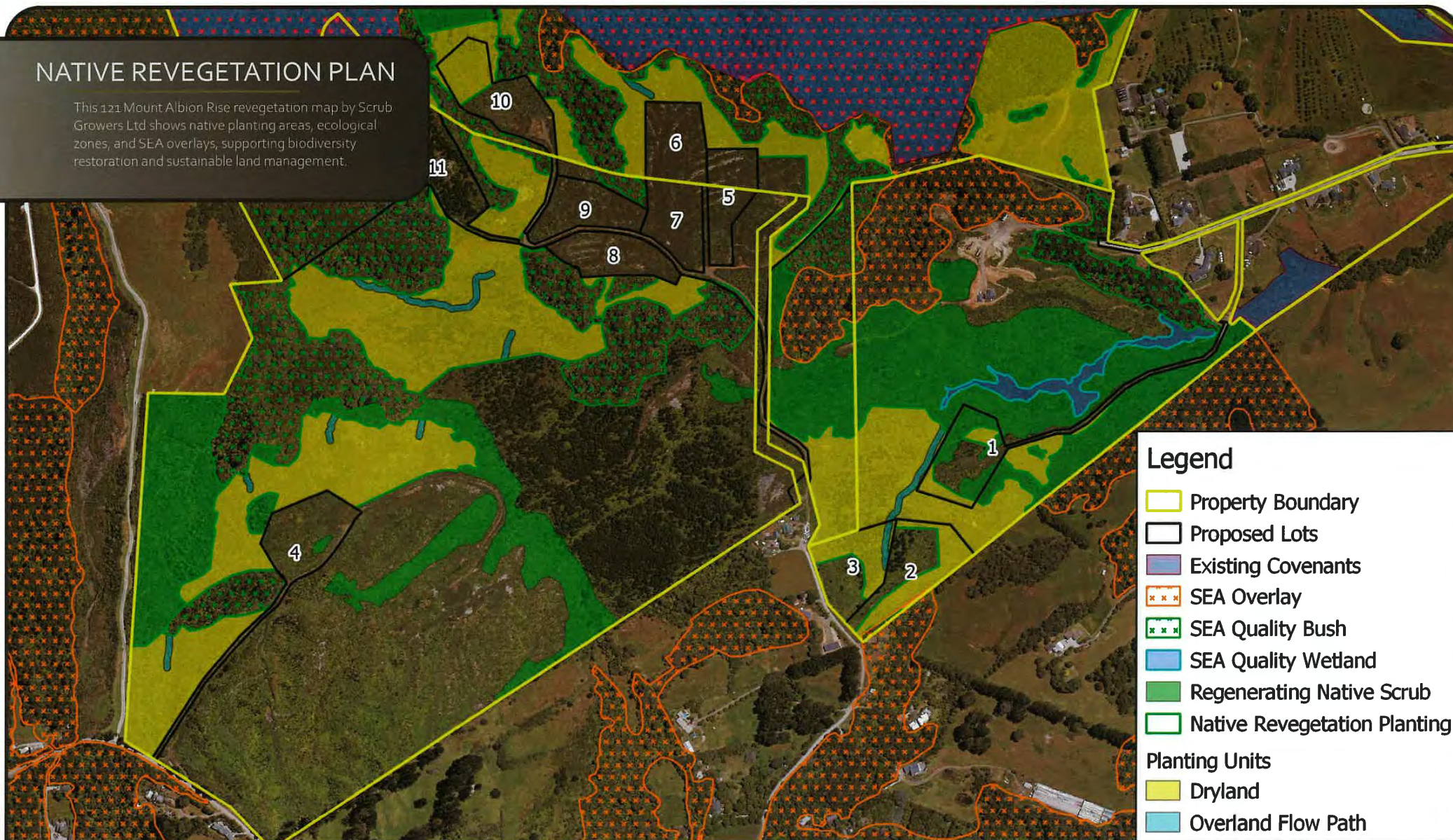


Osmocote Controlled Release Tablets, which slowly provide essential nutrients like nitrogen (14%), phosphorus (8%), potassium (2%), magnesium (2%), and trace elements such as iron and zinc. This ensures steady plant growth over time.

Cristal Rain fertilizer, which contains Potassium polyacrylate, a super absorbent polymer (SAP) that improves soil water retention. This helps plants withstand dry conditions by slowly releasing stored moisture along with essential nutrients.

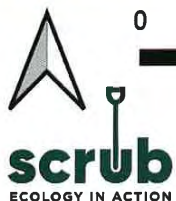
NATIVE REVEGETATION PLAN

This 121 Mount Albion Rise revegetation map by Scrub Growers Ltd shows native planting areas, ecological zones, and SEA overlays, supporting biodiversity restoration and sustainable land management.



Legend

- Property Boundary
 - Proposed Lots
 - Existing Covenants
 - SEA Overlay
 - SEA Quality Bush
 - SEA Quality Wetland
 - Regenerating Native Scrub
 - Native Revegetation Planting
- Planting Units**
- Dryland
 - Overland Flow Path



0 100 200 300 400 500
Meters

Projection: NZGD2000 / Mount Eden 2000
Scale: 1:7500 @ A4
Data Sources: Auckland Council

This map has been produced by Scrub Growers Ltd using data provided by the client and/or one or more third parties. Scrub Growers Ltd accepts no responsibility for any action or liability arising from any incomplete or inaccurate information provided by the client and/or any third parties. The graphics are provided to the client for the benefit and use of the client for the purpose for which it is intended.

121 Mount Albion Rise
Native Revegetation Planting Units

KAPOKAPOWAI

The native new zealand giant bush dragonfly



lava live under water

circular eggs

sheds shell

lava head

intresting mating
formation

hexagonal pattern



the native nz dragonfly
has bright yellow stripes

center of gravity at
the front end of body

x-wing formation

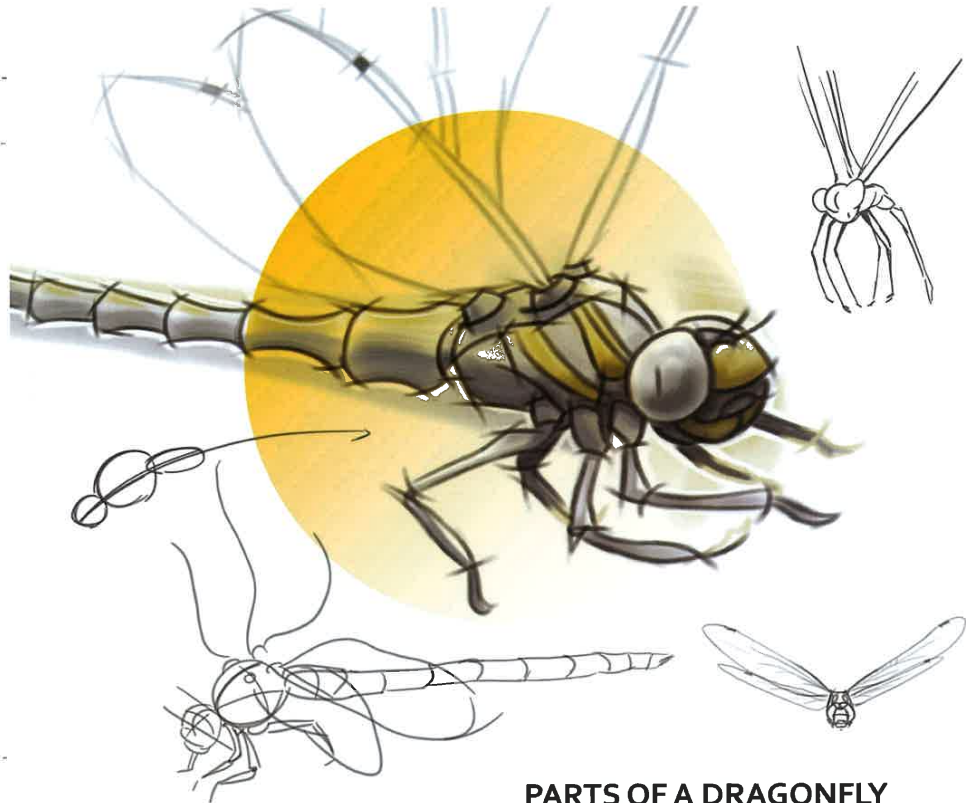
front heavy with
long tail to balance



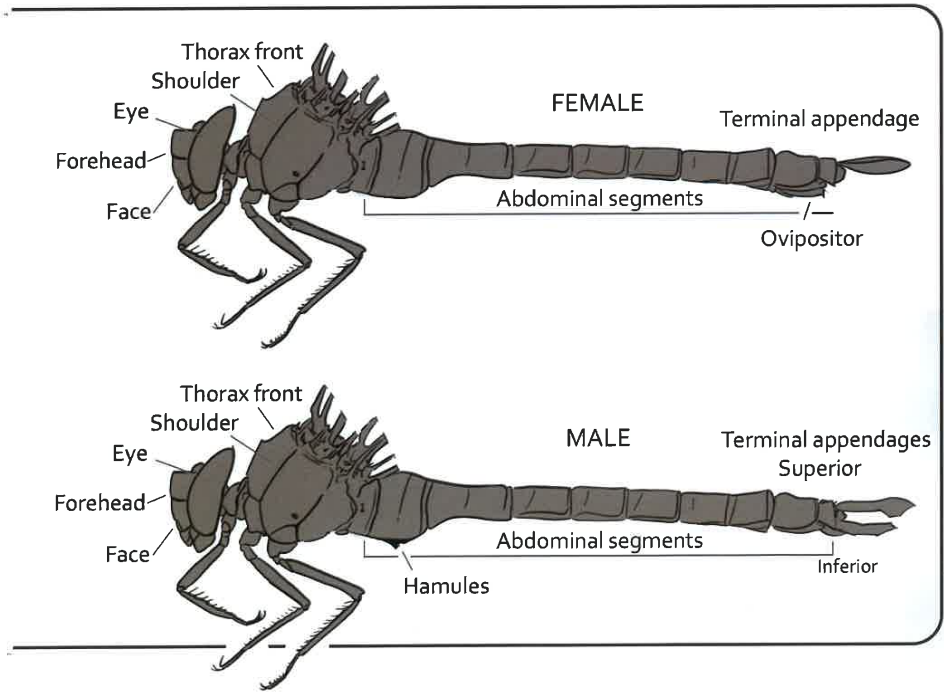
very functional legs

circular compound eye

gaint nz bush dragonfly

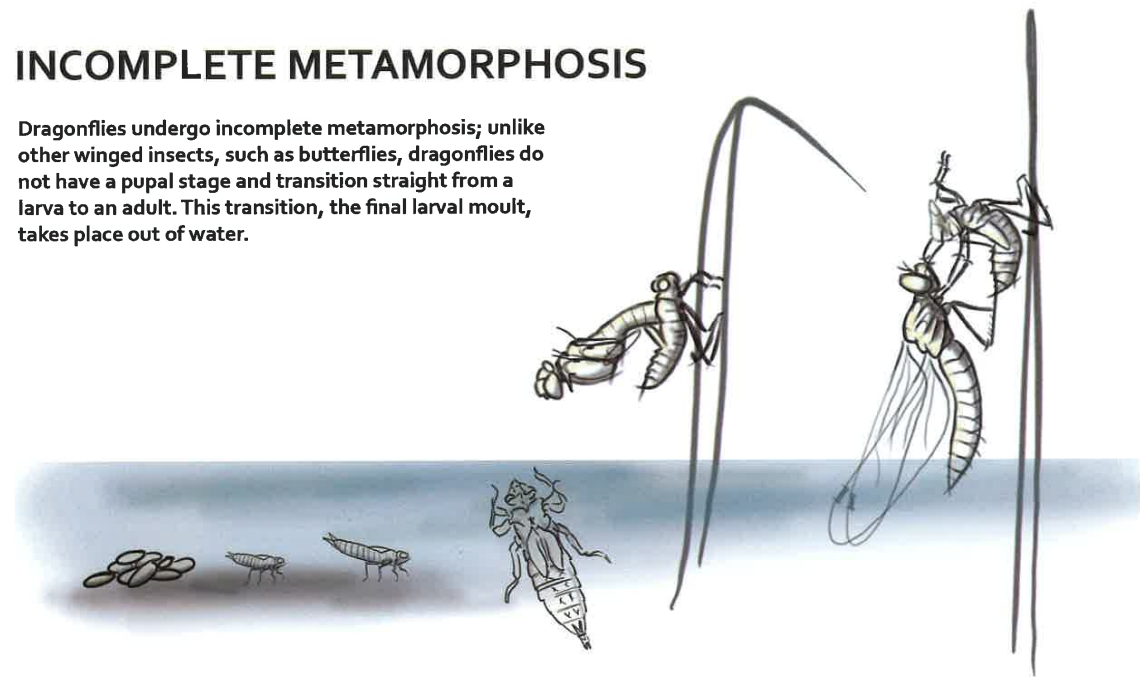


PARTS OF A DRAGONFLY



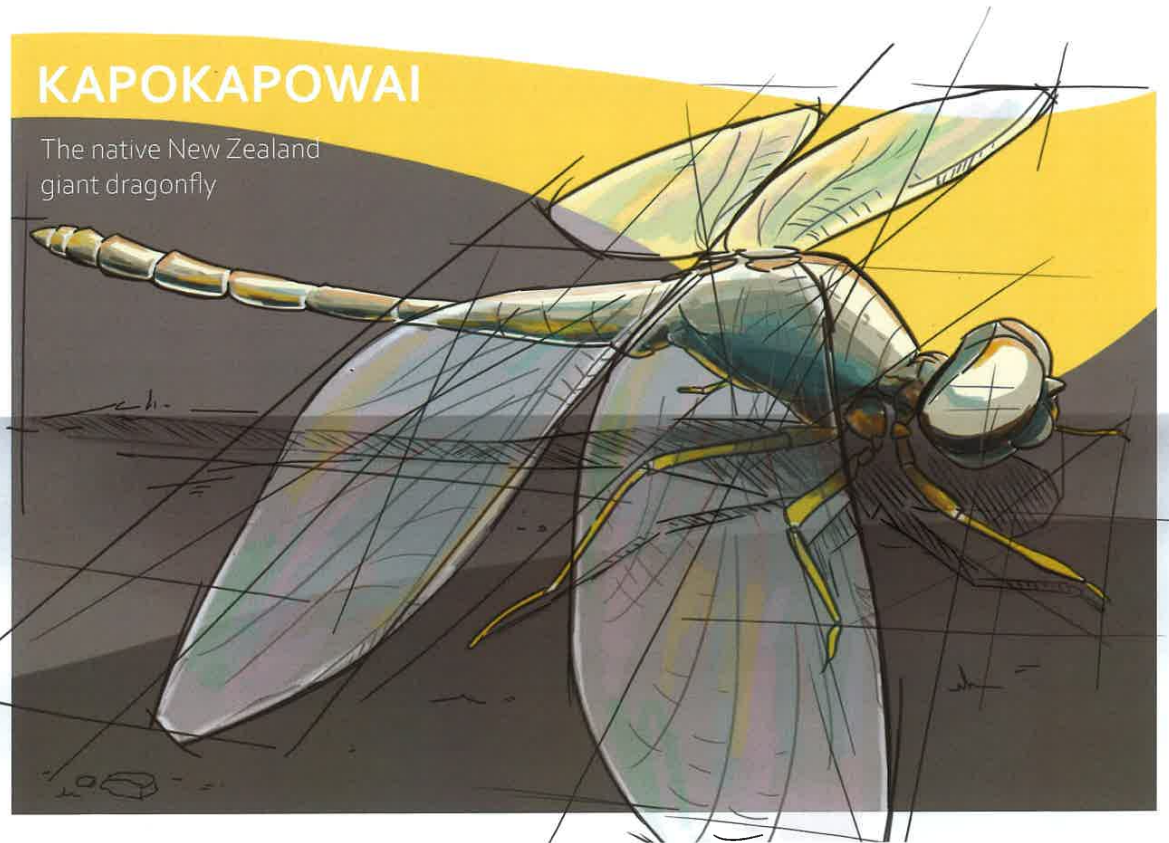
INCOMPLETE METAMORPHOSIS

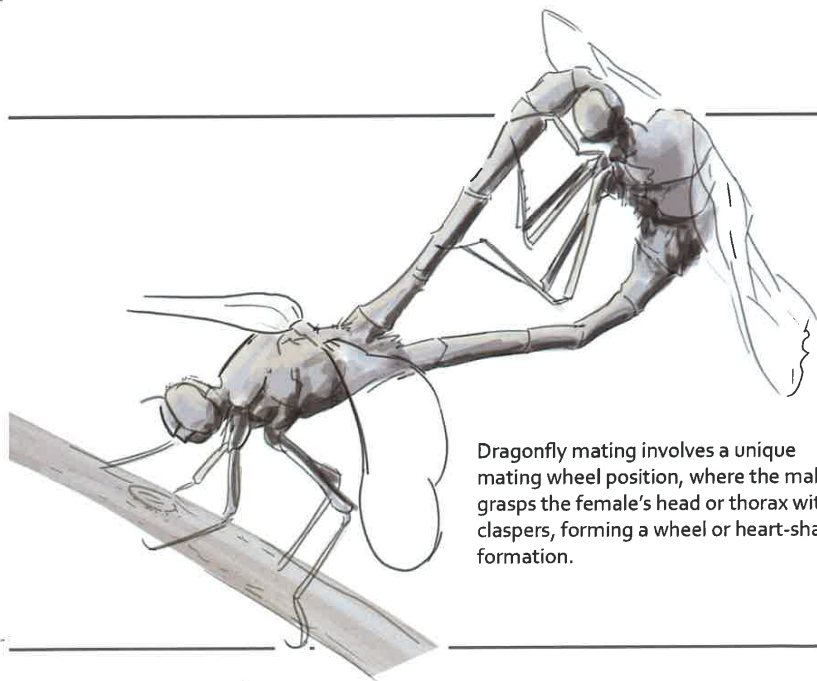
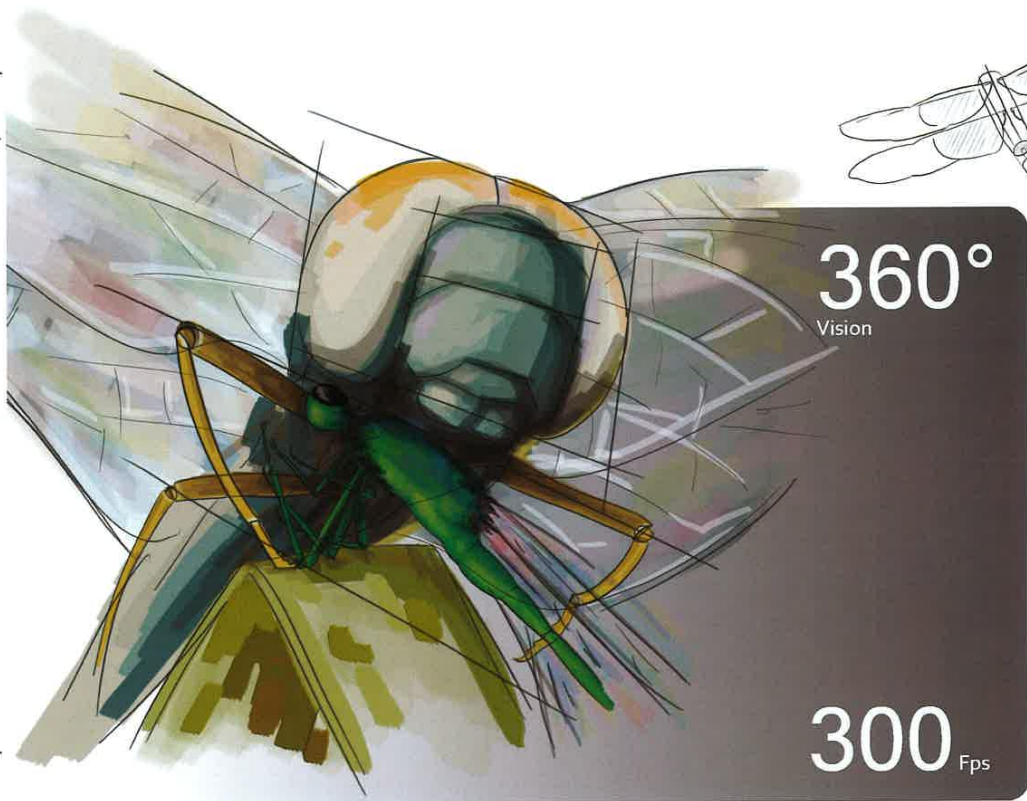
Dragonflies undergo incomplete metamorphosis; unlike other winged insects, such as butterflies, dragonflies do not have a pupal stage and transition straight from a larva to an adult. This transition, the final larval moult, takes place out of water.



KAPOKAPOWAI

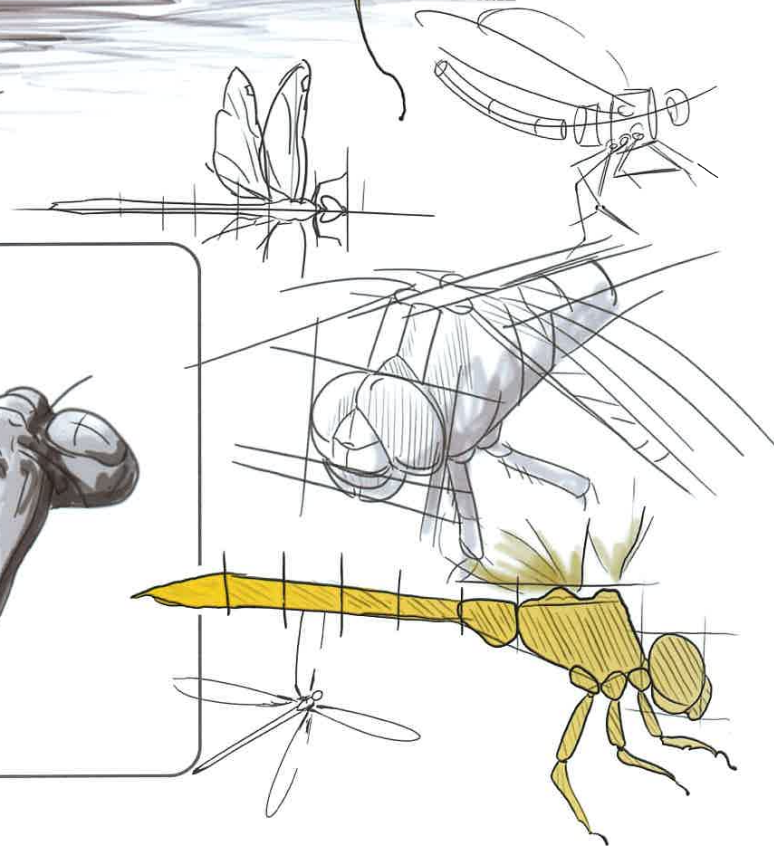
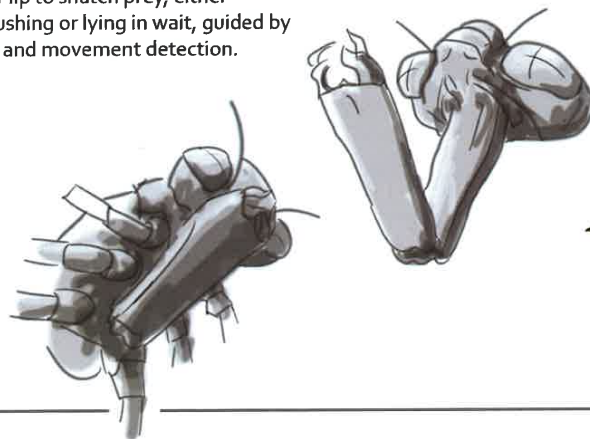
The native New Zealand giant dragonfly

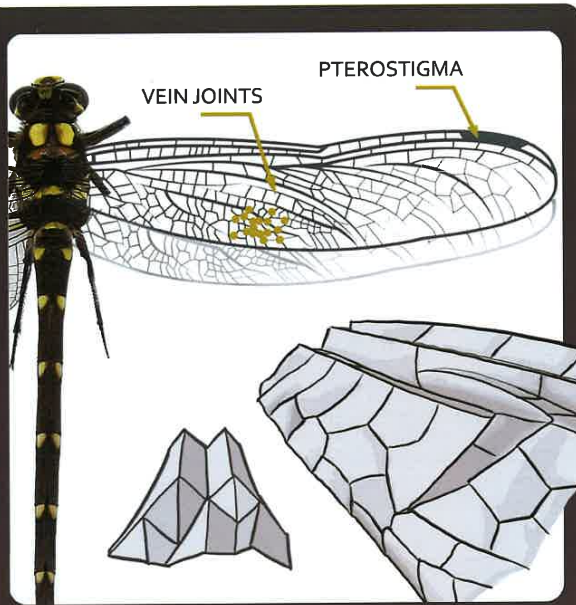




Dragonfly mating involves a unique mating wheel position, where the male grasps the female's head or thorax with claspers, forming a wheel or heart-shaped formation.

Nymphs use a retractable, hook-tipped lower lip to snatch prey, either ambushing or lying in wait, guided by sight and movement detection.





ABSTRACTION

Wing Anatomy



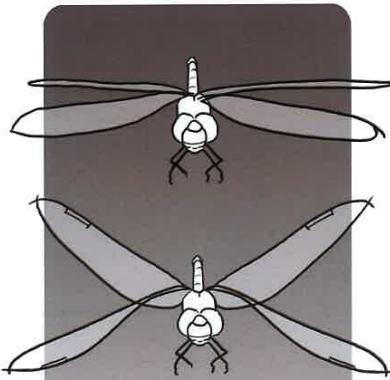
Wing & Tail Movement

Wing Anatomy

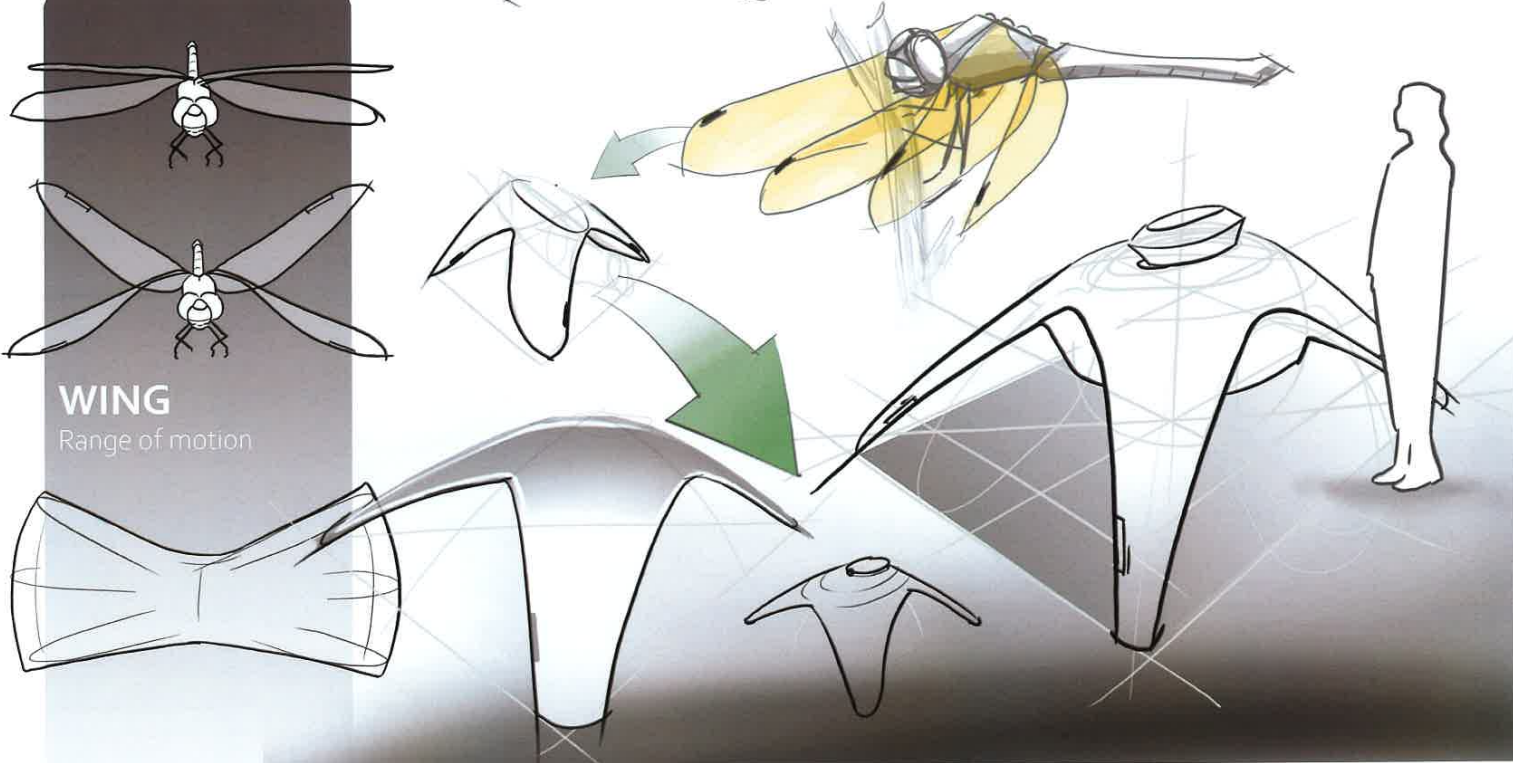
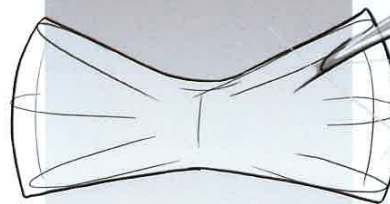


Hunting Movement

Wing & Tail Movement

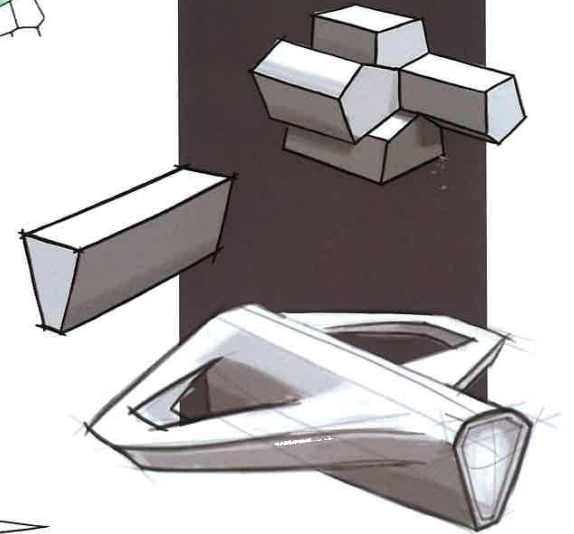


WING
Range of motion



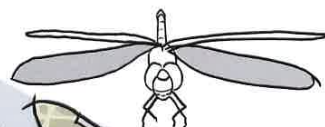
EXTRUSION

Of dragonfly wing vein

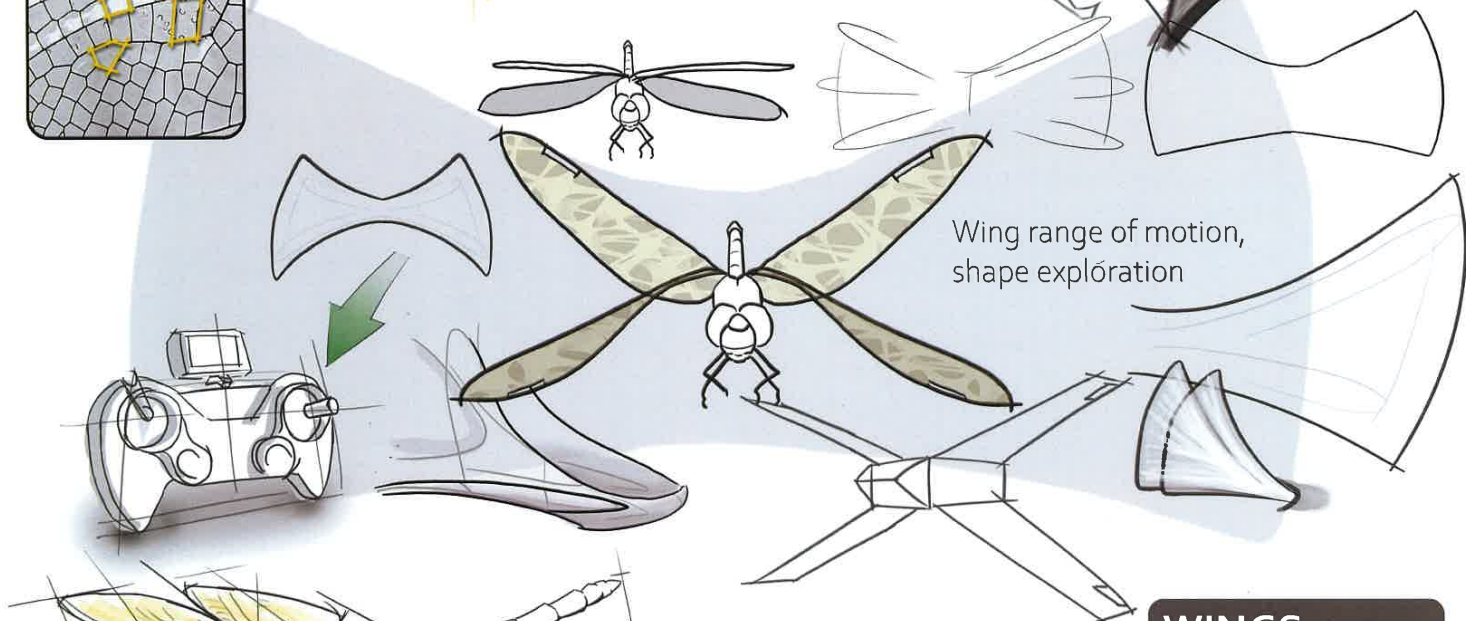


WING VEIN SEGMENT

Vein pattern used as for
carbon fiber like material
& Influences form

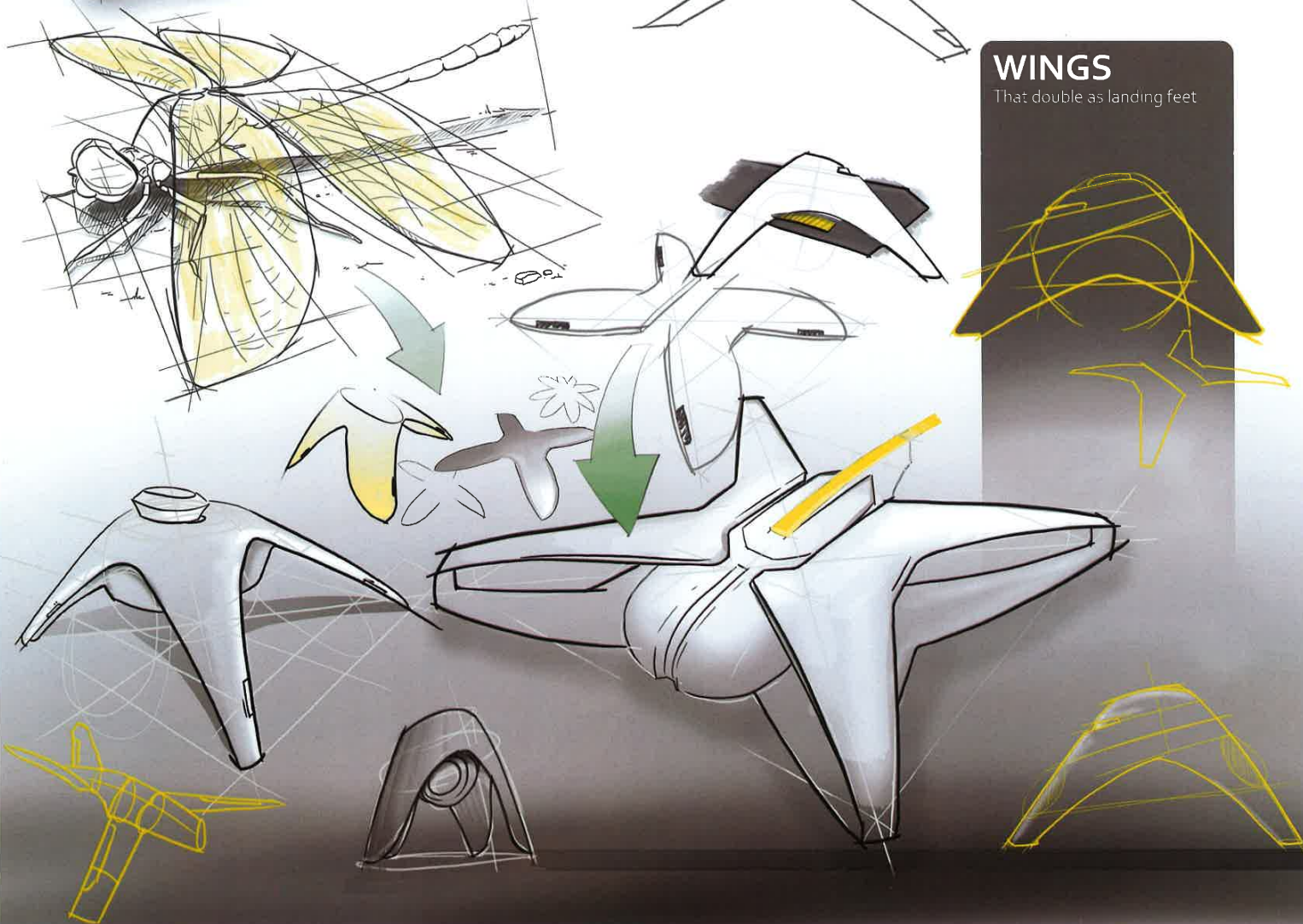


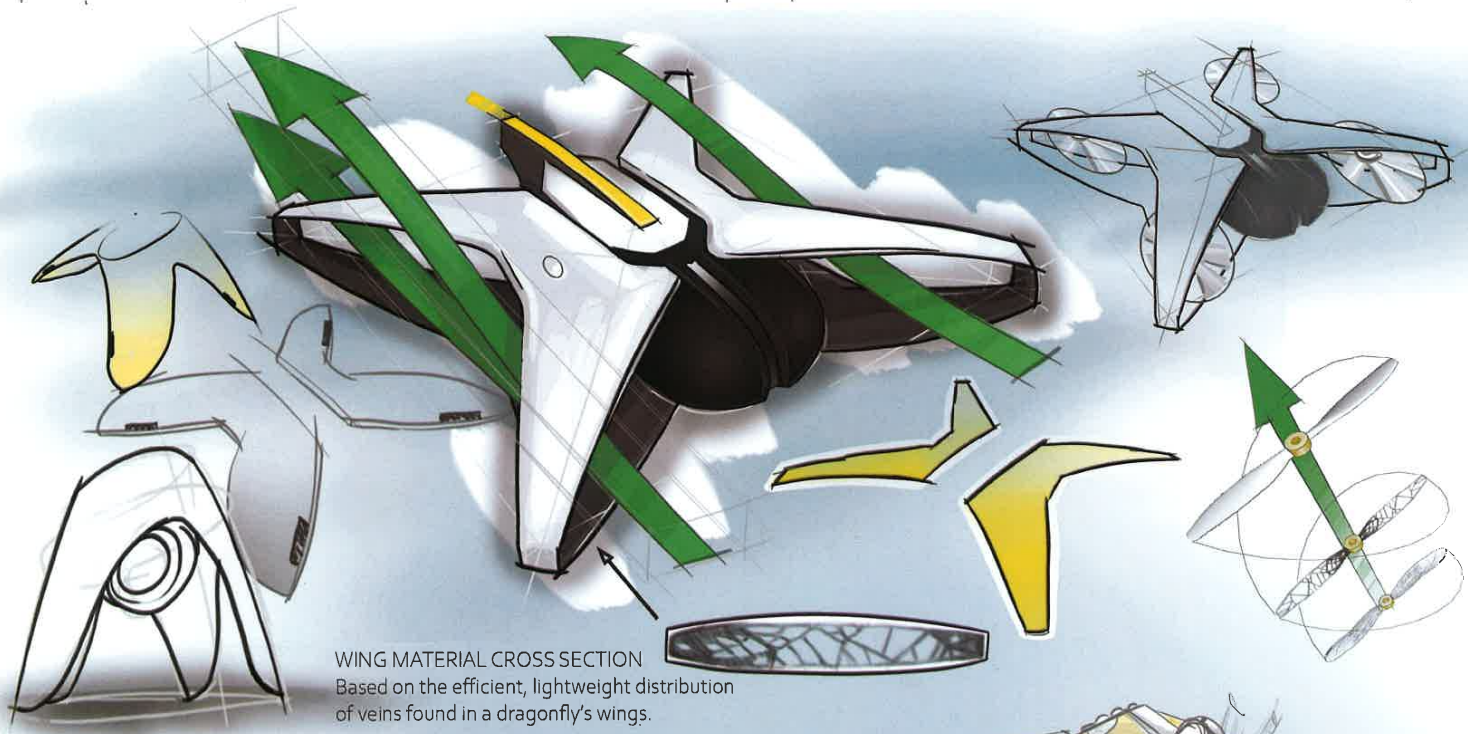
Wing range of motion,
shape exploration



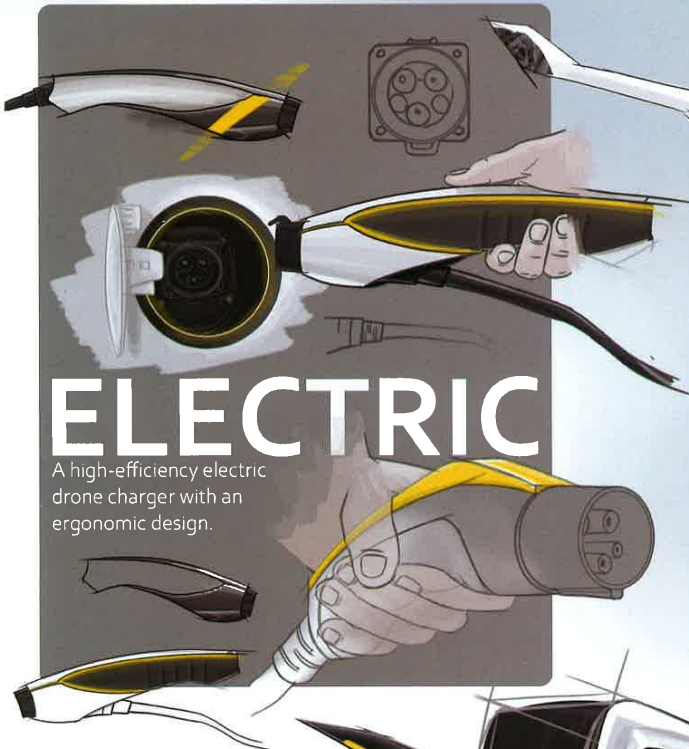
WINGS

That double as landing feet



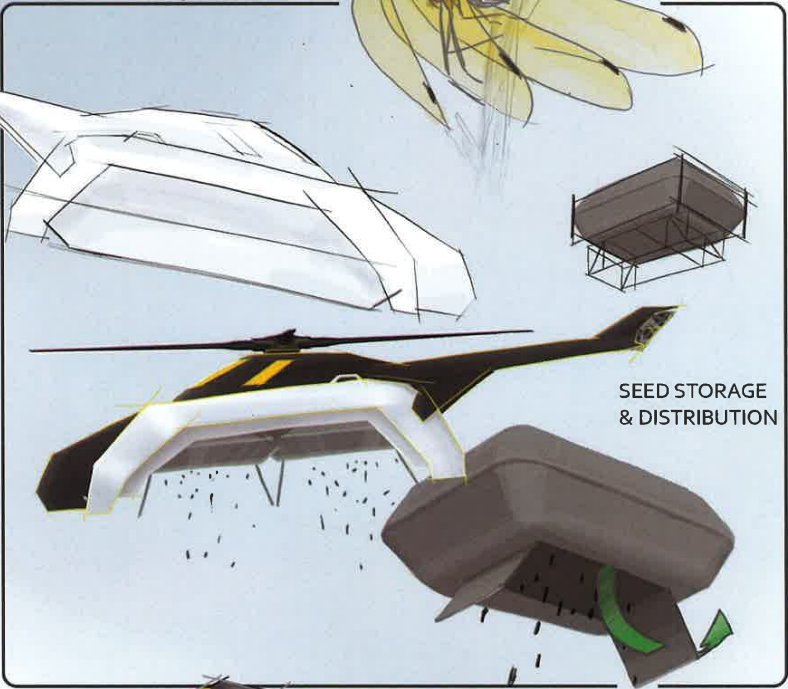


WING MATERIAL CROSS SECTION
Based on the efficient, lightweight distribution
of veins found in a dragonfly's wings.

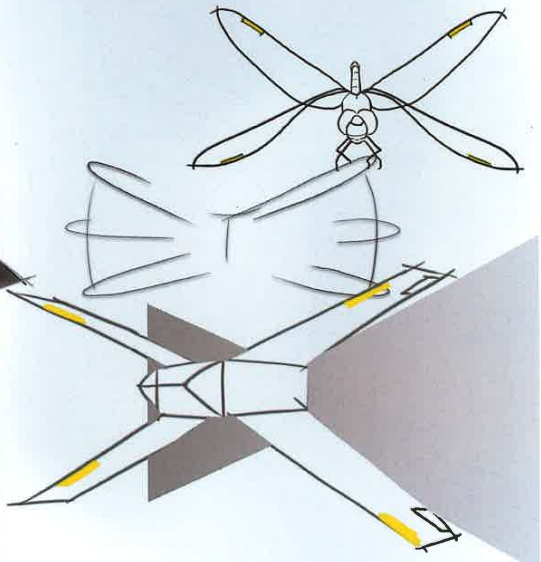


ELECTRIC

A high-efficiency electric
drone charger with an
ergonomic design.



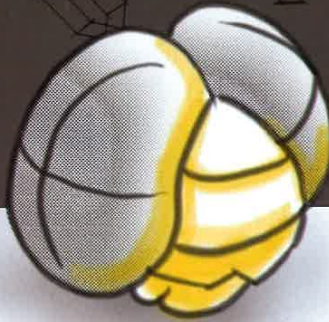
SEED STORAGE
& DISTRIBUTION



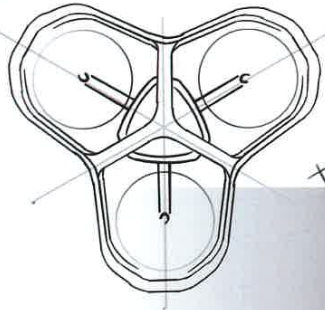
EYE ANATOMY



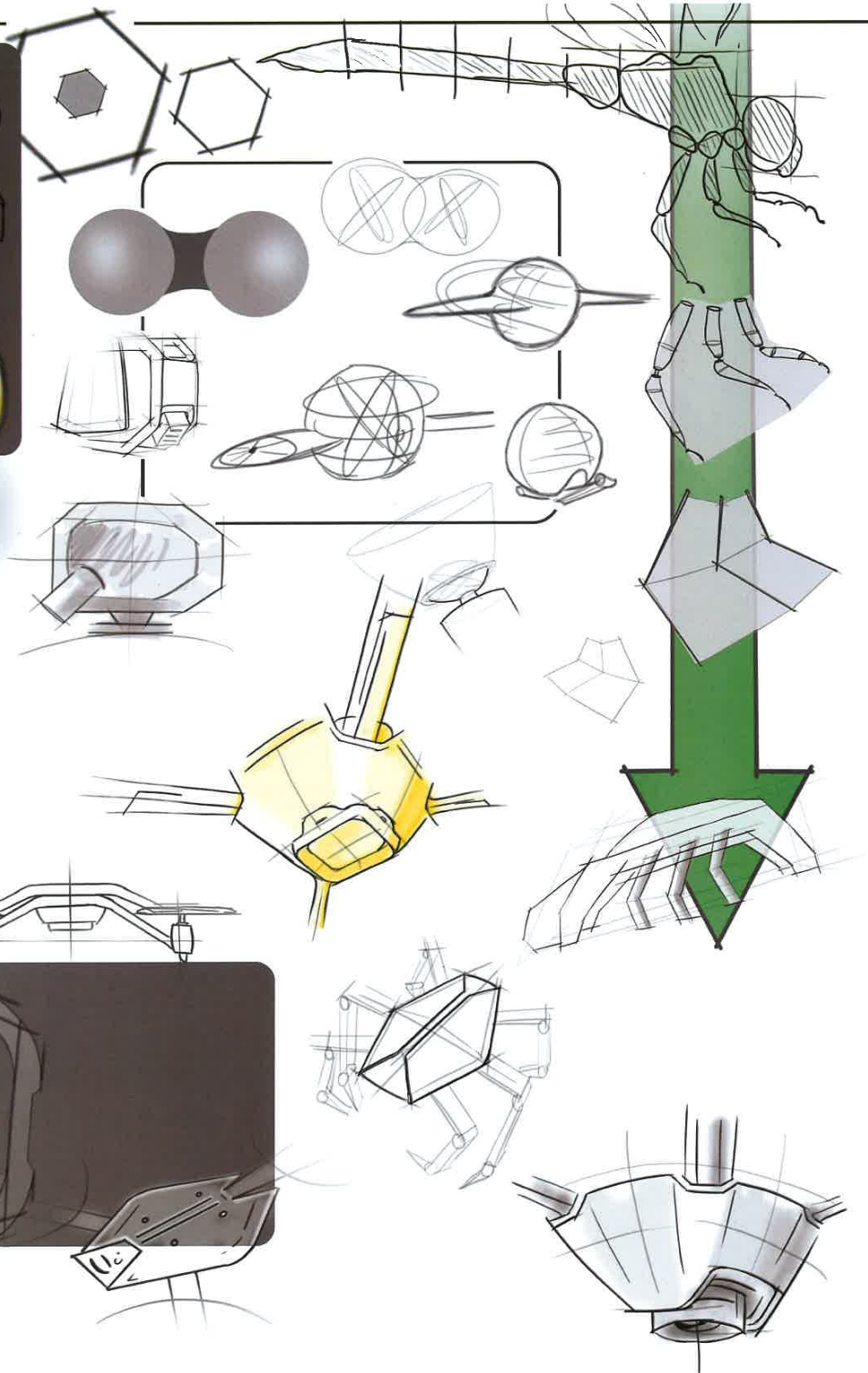
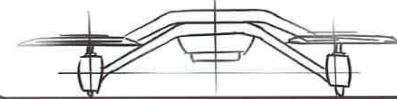
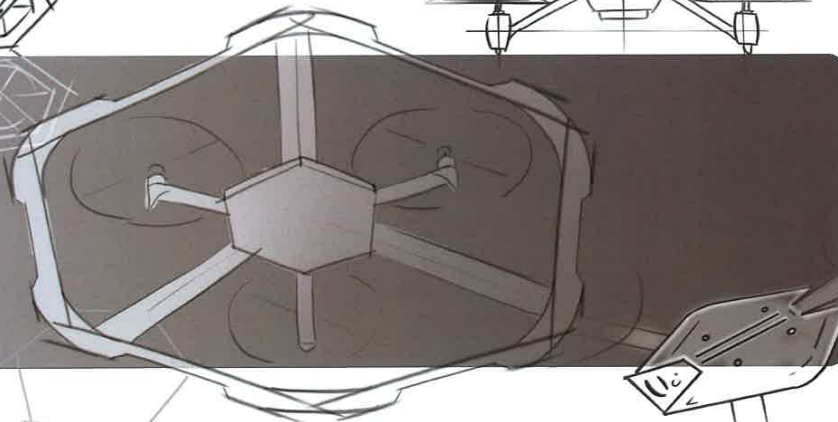
Compound eye



Hexagonal pattern-inspired cooling exterior mechanism



HEXAGONAL PROPELLER GUARDS



SEED CAPSULES

that could be dropped from an aircraft

Adaptable exterior cooling mechanism

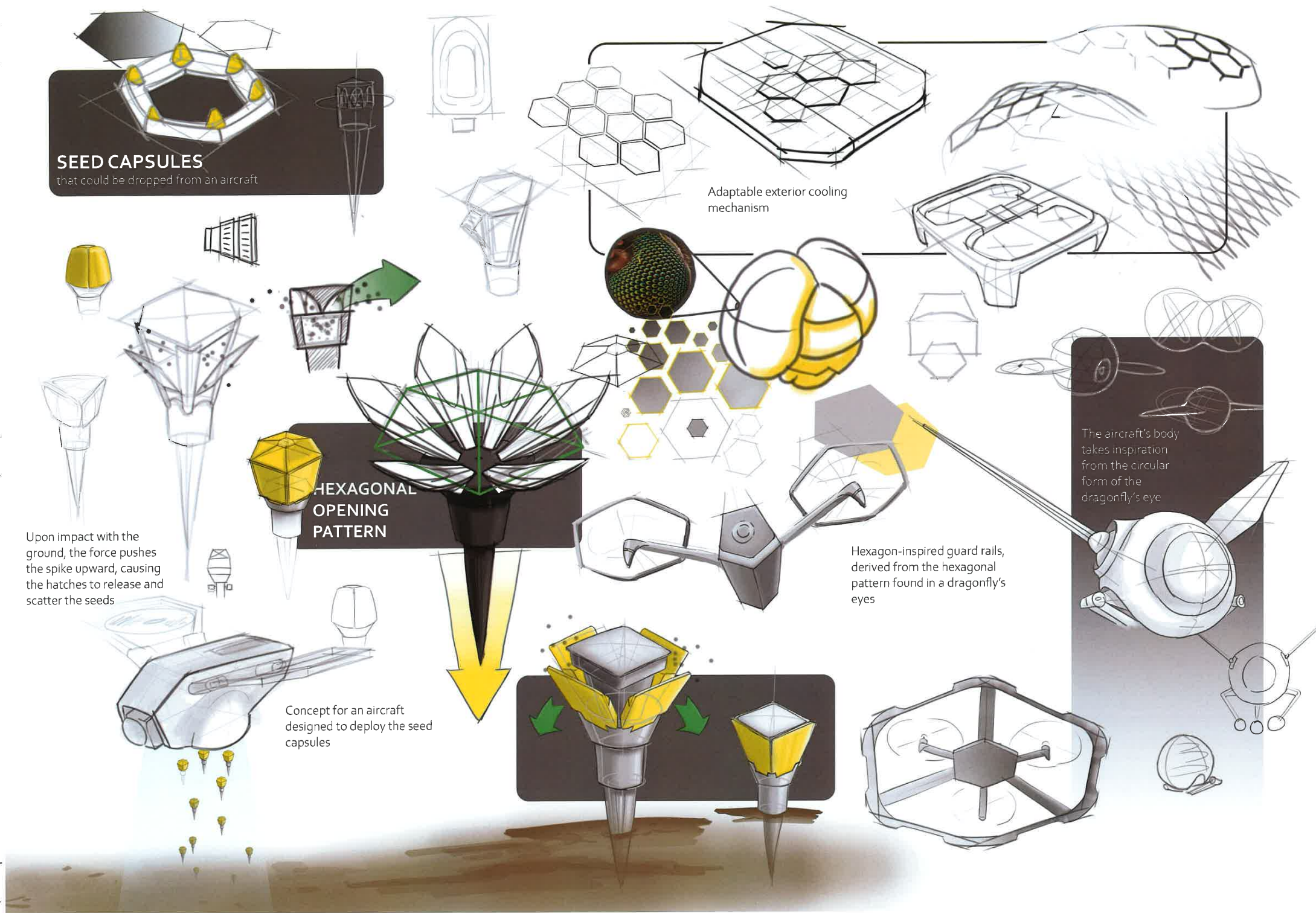
HEXAGONAL OPENING PATTERN

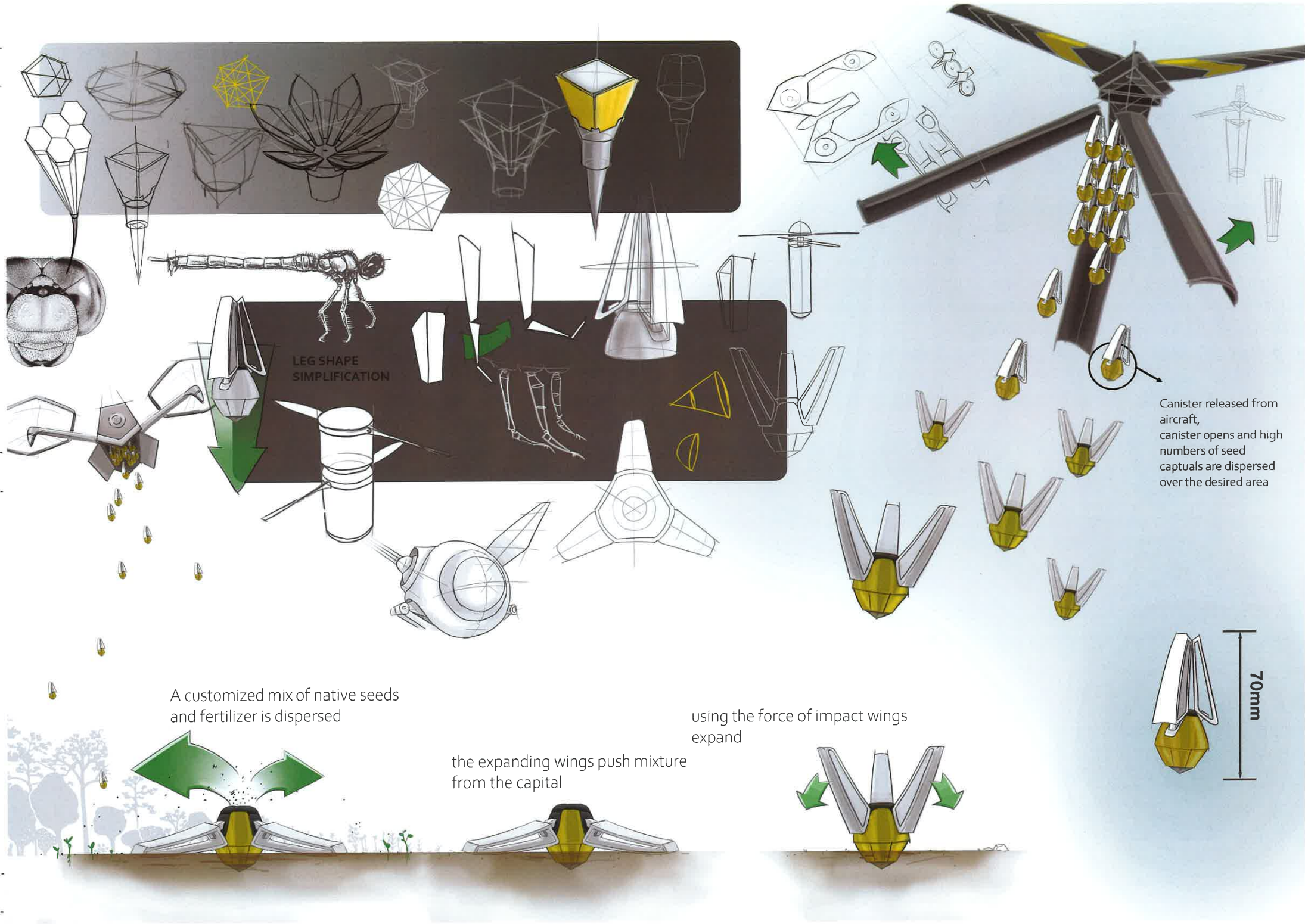
Upon impact with the ground, the force pushes the spike upward, causing the hatches to release and scatter the seeds

Concept for an aircraft designed to deploy the seed capsules

Hexagon-inspired guard rails, derived from the hexagonal pattern found in a dragonfly's eyes

The aircraft's body takes inspiration from the circular form of the dragonfly's eye





LEG SHAPE
SIMPLIFICATION

Canister released from
aircraft,
canister opens and high
numbers of seed
capsules are dispersed
over the desired area

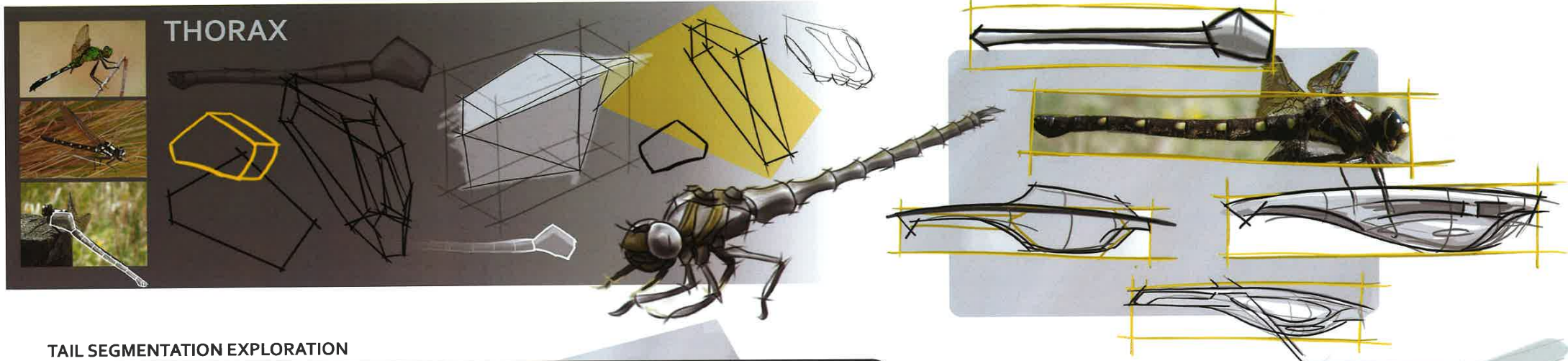
A customized mix of native seeds
and fertilizer is dispersed

using the force of impact wings
expand

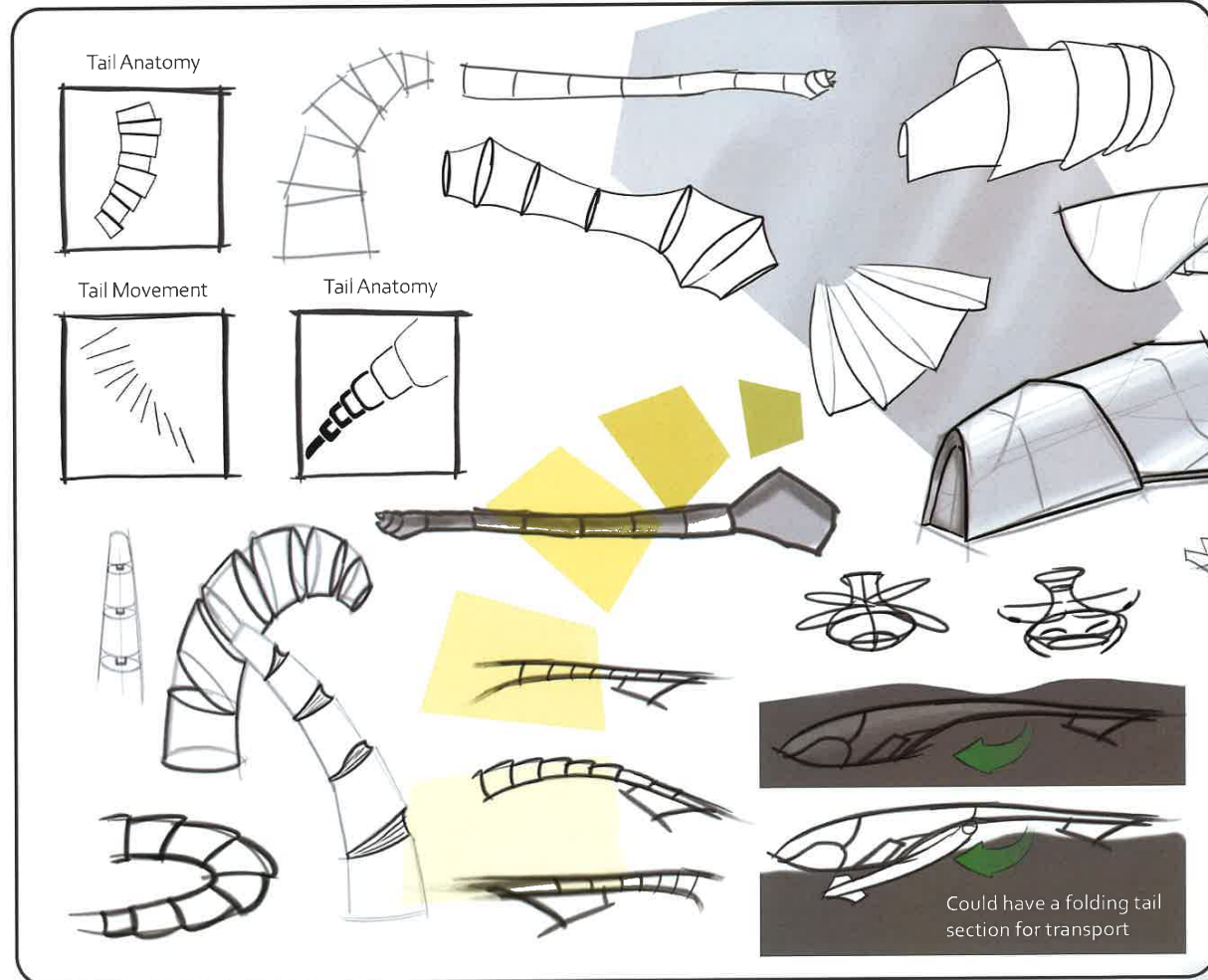
the expanding wings push mixture
from the capital

70mm

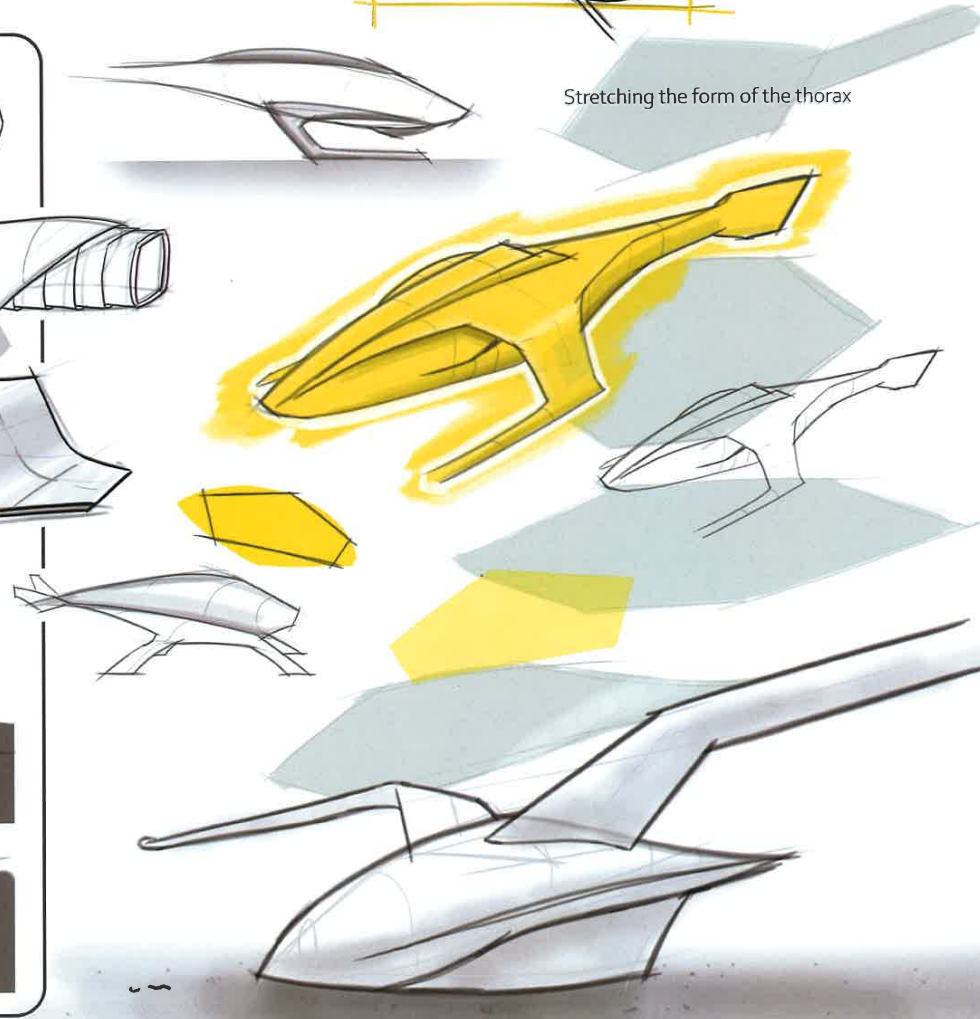
THORAX



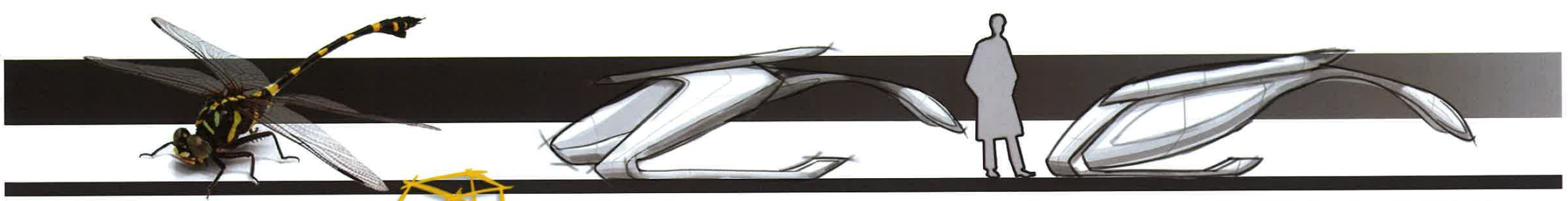
TAIL SEGMENTATION EXPLORATION



Stretching the form of the thorax



Could have a folding tail section for transport

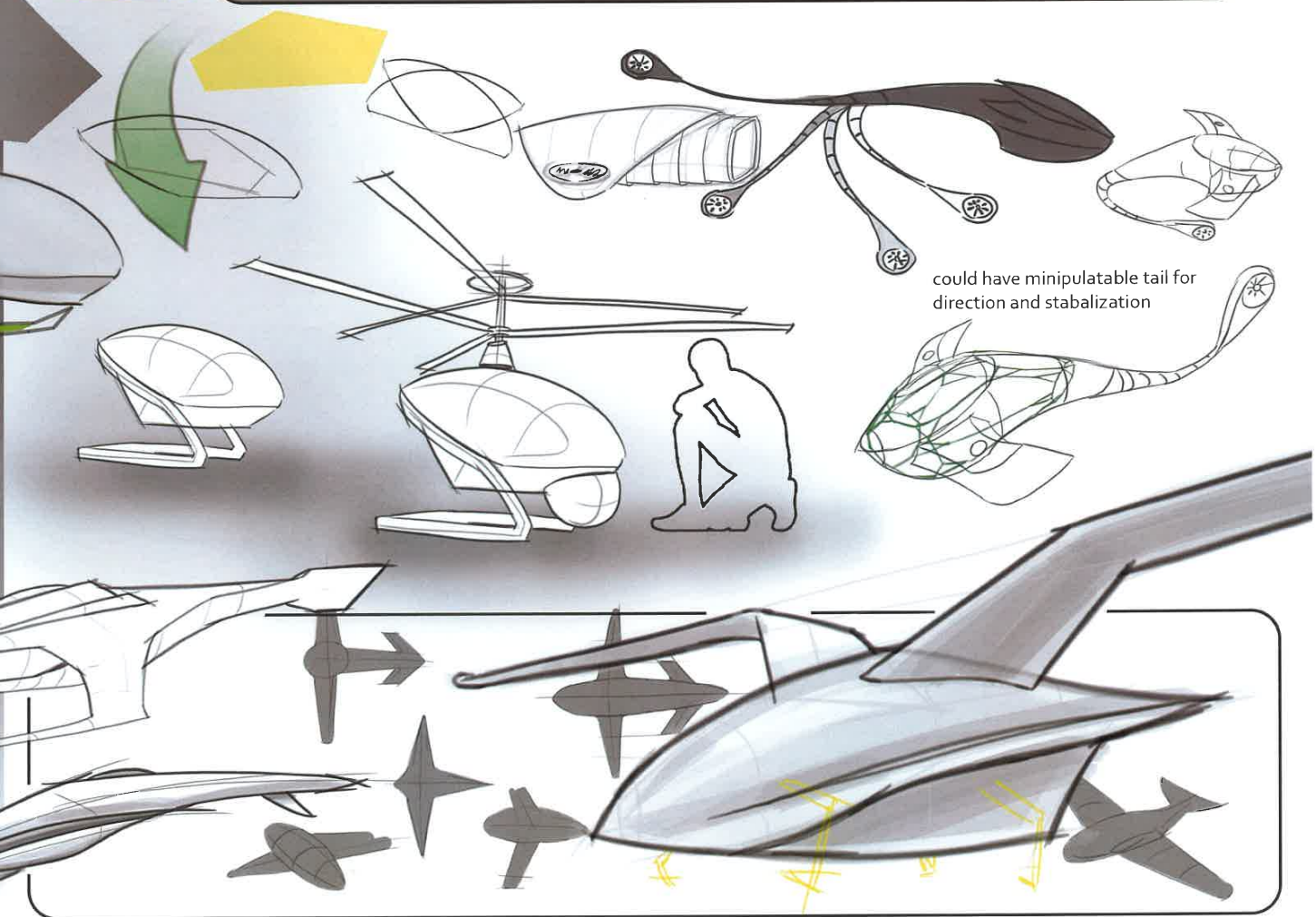
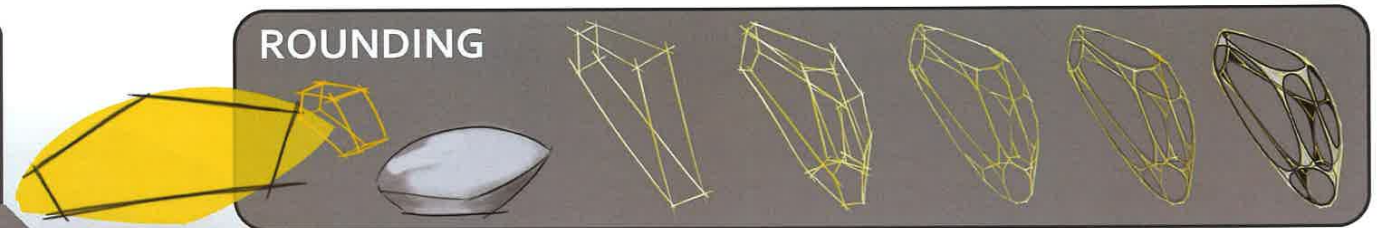


STRETCHING

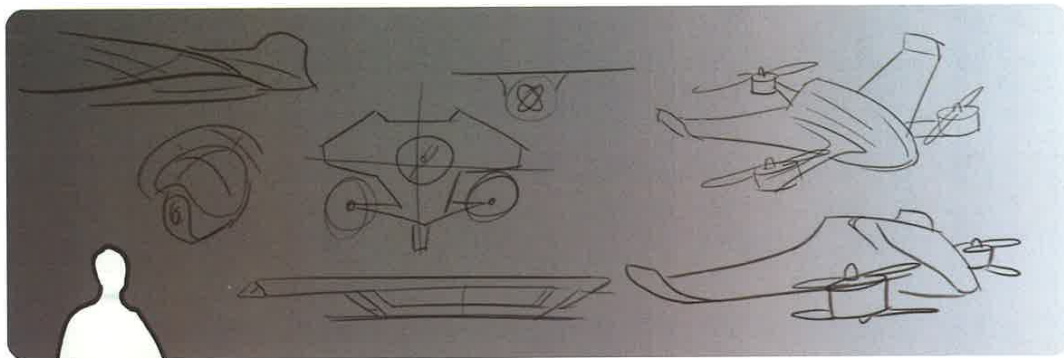
Stretching thorax form
for a more aerodynamic
design



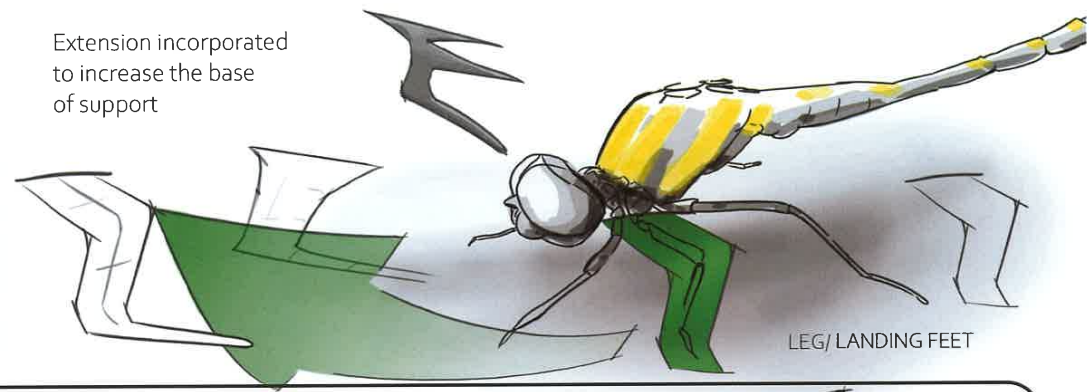
ROUNDING



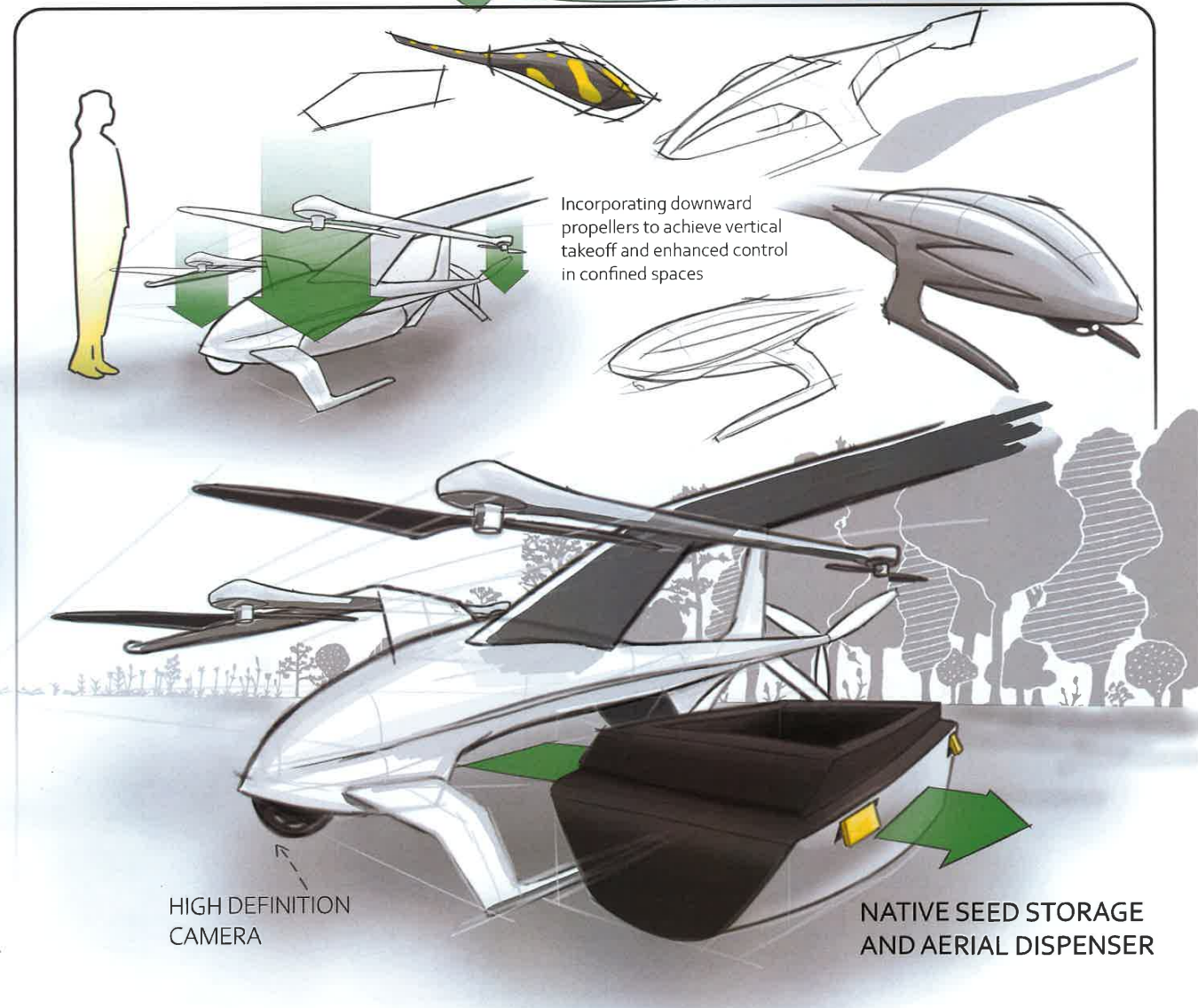
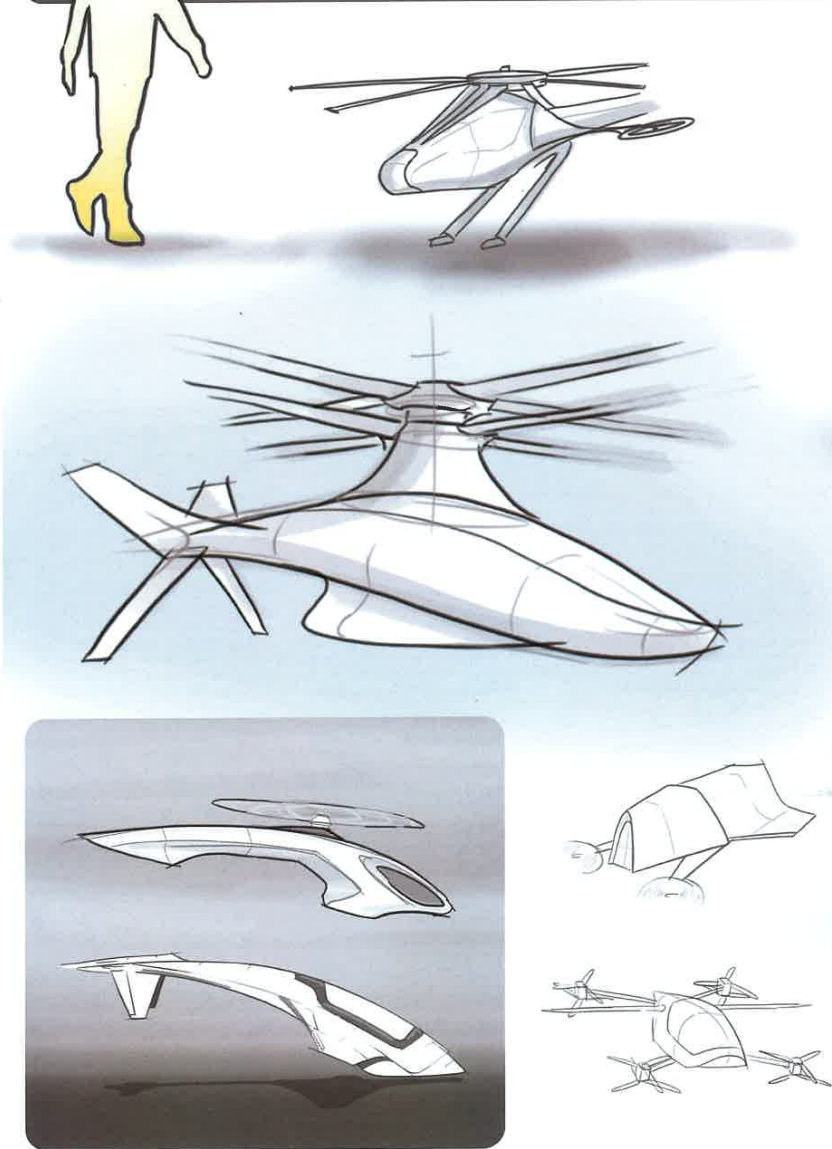
could have minipulatable tail for
direction and stabalization



Extension incorporated
to increase the base
of support



LEG/ LANDING FEET



Incorporating downward
propellers to achieve vertical
takeoff and enhanced control
in confined spaces

HIGH DEFINITION
CAMERA

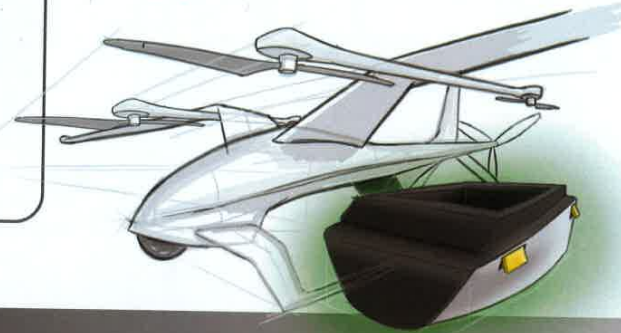
NATIVE SEED STORAGE
AND AERIAL DISPENSER

BRIEF & SPESIFICATIONS

I am designing an aerial seeding product to assist with native restoration planting in rough and remote areas.

- Autonomy & Self-Sufficiency
- Commercial Use
- Eco-Friendly Design
- Planting & Efficiency

R3



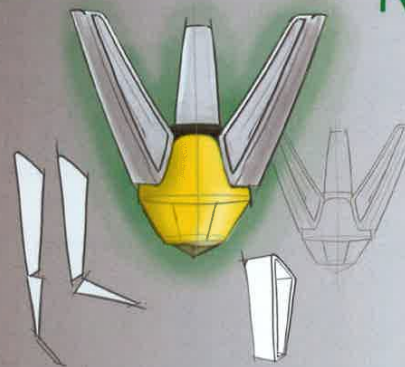
Design equipped with wings and a propeller for extended range operations, the aircraft also features attachable downward facing propellers to enable accurate, controlled maneuvering in tight & complex environments. Also Equipped with a secure payload system for carrying large quantities of native seed-dispersing capsules.

CHOSEN CONCEPTS

R1



R2



Designed for efficiency, precision, and eco-friendly restoration, the aircraft features a high-definition camera for autonomous navigation, an aerodynamic structure for optimized flight, and a secure payload system for carrying large quantities of native seed-dispersing capsules.

Upon ground impact, the capsule's seed dispersal system activates, ensuring seeds are delivered directly into the soil. Each biodegradable capsule is crafted from plant-based materials with a fertilizer-infused tip to support early germination, making the system adaptable for all native seed types and sustainable reforestation efforts.



Roger Stevenson is the director and chief pilot of Skywork Helicopters Ltd, a New Zealand-based family business established in 1997.

Under his leadership, the company has achieved notable recognition including the New Zealand Civil Aviation Authority's Aviation Safety Award of Excellence (twice) and has maintained 25 years of accident-free operations.

Skywork Helicopters also received an NZ Search and Rescue Certificate of Achievement for its role in a rescue mission on Mount Parihaka, which was accepted by Roger Stevenson at Government House.

SKYWORK™

Skywork Helicopters, led by Roger Stevenson, operates across New Zealand's diverse and often challenging landscapes. Roger explained that the biggest hurdles in their work come from the country's steep terrain and rapidly changing weather, which can make flying risky and unpredictable. On top of this, strict aviation regulations require every job to be carefully planned and executed to the highest safety standards.

When it comes to spraying operations, Roger highlighted that **coverage and efficiency are everything**. The helicopter's spray system needs to release droplets that are consistent in size, ensuring even distribution across the land. Too large, and the product is wasted, too small, and it drifts away, missing the target. **Stability and precise control of the aircraft are therefore critical to achieving the right results.**

Modern technologies have made a big difference to this work. Roger noted that **GPS guidance allows pilots to cover ground more accurately without missing strips or overlapping**, while automated flow control adjusts output depending on speed. This combination improves efficiency and reduces waste, especially in New Zealand's variable weather conditions.

Looking to the future, **Roger sees drones as having strong potential in aerial seeding and spraying**. Provided they can achieve long flight times without constant recharging, carry a practical payload, and remain stable and manoeuvrable enough to ensure even distribution. **One of their greatest advantages is being unmanned**, which avoids many of the strict safety regulations that apply to helicopters, making them far more versatile and cost-effective. With the **addition of an AI piloting system**, drones could also minimise human error, leading to more precise application, improved efficiency, and safer operations overall.

Maintenance is a key issue, with nozzle blockages and pump wear reducing efficiency over time. Using durable, lightweight materials and easier-to-clean systems would save both time and money. Roger noted that nozzles are the heart of the system, and a design that **adjusts droplet size automatically would be a "game-changer"** for efficiency and environmental impact.

For Roger and Skywork, efficiency, precision, and adaptability define success. His insights show that any future aerial system whether helicopter or drone must combine endurance, manoeuvrability, and smart technology to truly be effective in the field.

Photo of Roger spraying a Scrub Ecology Ltd planting site



As part of my design process, I questioned people with real-world experience to gain insights into how the aircraft would realistically be used. Their feedback highlighted key functional improvements and necessities, ensuring the design not only looks effective but also meets practical demands in the field.

Rodney – Co-Founder of Scrub Ecology

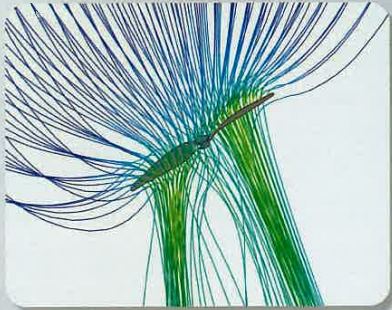
“The most important thing for this design is **versatility**. The aircraft needs to be able to handle **both planting and spraying**. Seeds only have the best chance of germination during the winter months, so in summer the craft must still be useful for spraying. That way, it's in **operation year-round**, which makes it much more **cost-effective**.”

Michael – Operations Manager at Scrub Ecology

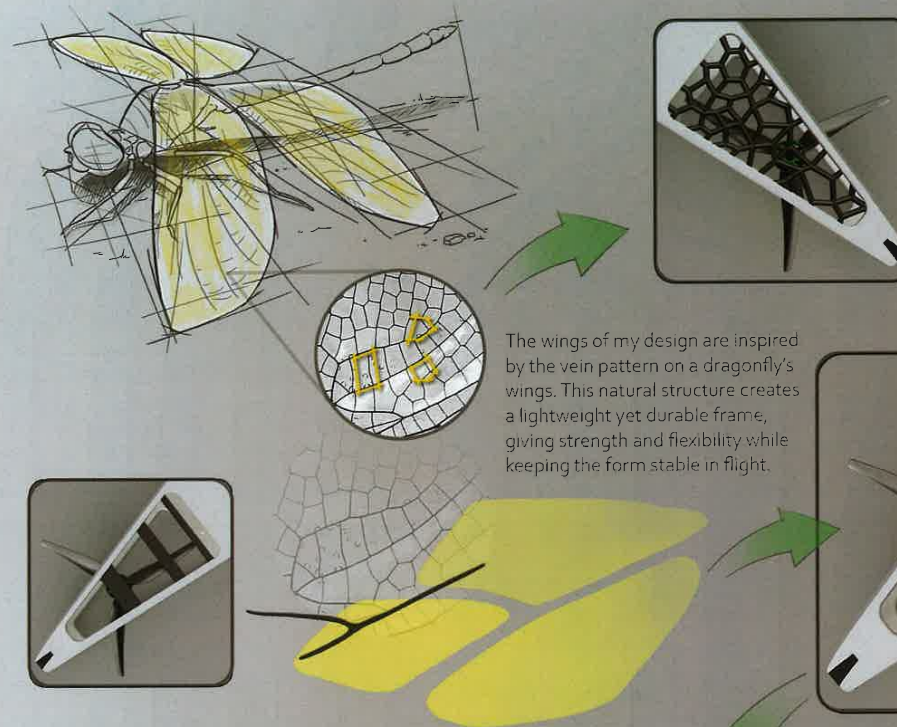
“Efficiency is key. The aircraft should be designed so it can be **operated and maintained by as few people as possible**. If it can replace a team of workers while still **achieving the same or better results**, it will save time, labour, and money.”

“ The most important factor when we’re flying is flight time. The longer we can stay in the air without refuelling, the more time-efficient the job becomes. But it’s not just about endurance—the aircraft also needs to be highly manoeuvrable and stable. That way we can ensure an even distribution of payload and hit the correct landing zones every time. ”

— Roger Stevenson, Skywork Helicopters

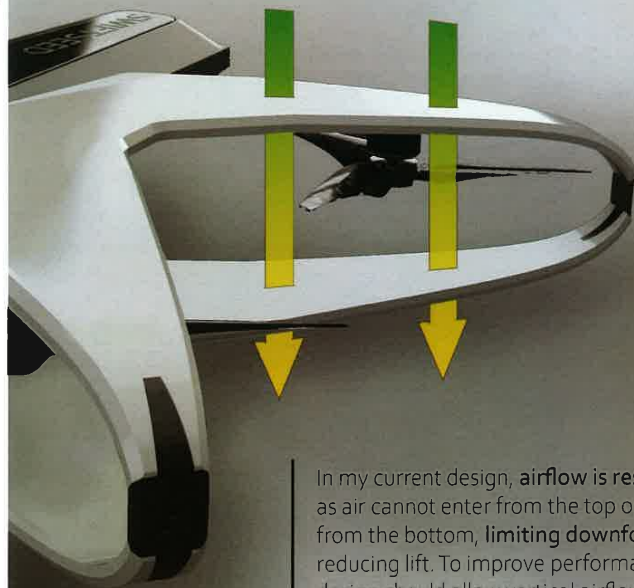


For the drone to generate lift, **air must be both pulled from above the design and pushed below it**. This movement of air creates a pressure difference, which is essential for keeping the drone **airborne**. Adequate **airflow** is crucial without enough circulation, the **lift force** will be weak, making the drone unstable.



The wings of my design are inspired by the vein pattern on a dragonfly's wings. This natural structure creates a lightweight yet durable frame, giving strength and flexibility while keeping the form stable in flight.

These iterations focus on improving how air moves across the wing. Using biomimicry, the wing shape has been refined with airflow channels to increase lift and efficiency, while keeping the original dragonfly-inspired form and propeller placement.



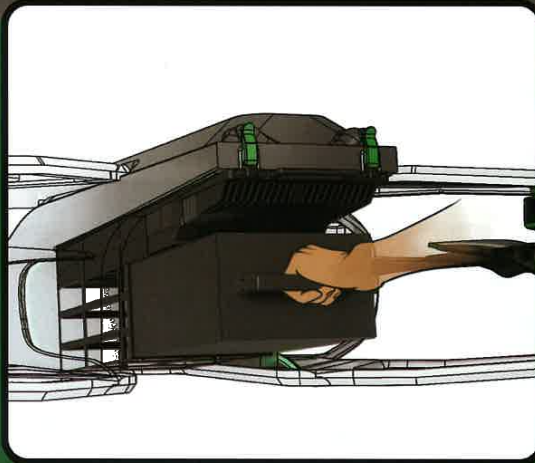
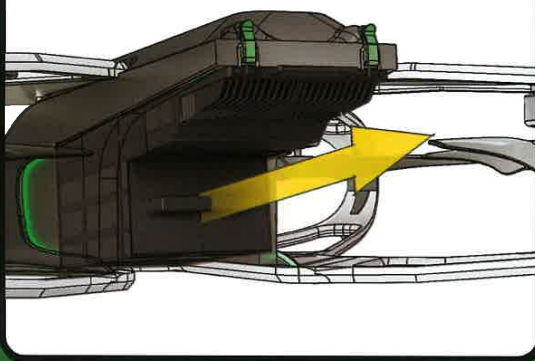
In my current design, **airflow is restricted** as air cannot enter from the top or exit from the bottom, **limiting downforce** and reducing lift. To improve performance, the design should allow vertical airflow, **creating stronger lift**, greater efficiency.

An opening in the main body **directs airflow** over the battery during flight, allowing **cool air** to pass through and **prevent overheating**.

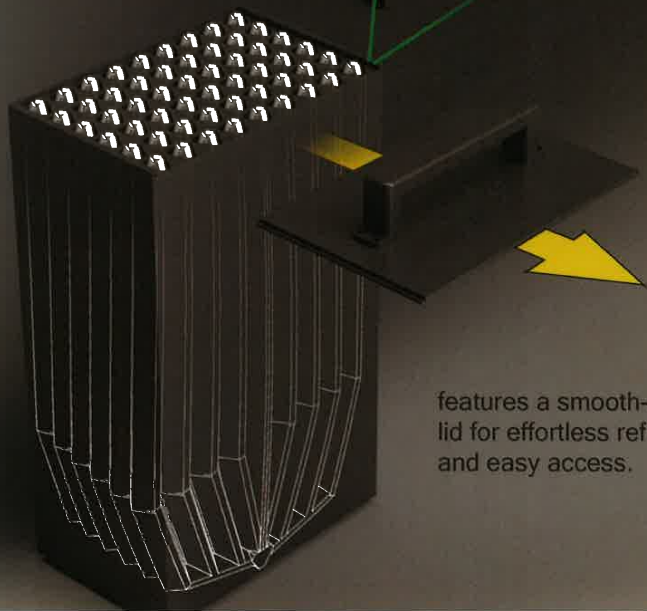
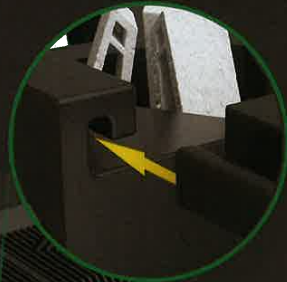




Drone Pay Load
easy refill



Each flight carries 435 seed capsules, each containing 20 native seeds. Assuming an 80% germination rate, around 6,960 trees are projected to establish per deployment. The modular storage unit allows for rapid replacement, enhancing reloading efficiency.



features a smooth-sliding lid for effortless refilling and easy access.



seed captual deployment

The seed capsules carry a custom mix of eco-sourced native seeds that get released on impact, scattering widely. A slow-release fertilizer blend packed in the casing then supports germination, helping the seeds establish quickly and grow strong.

36mm



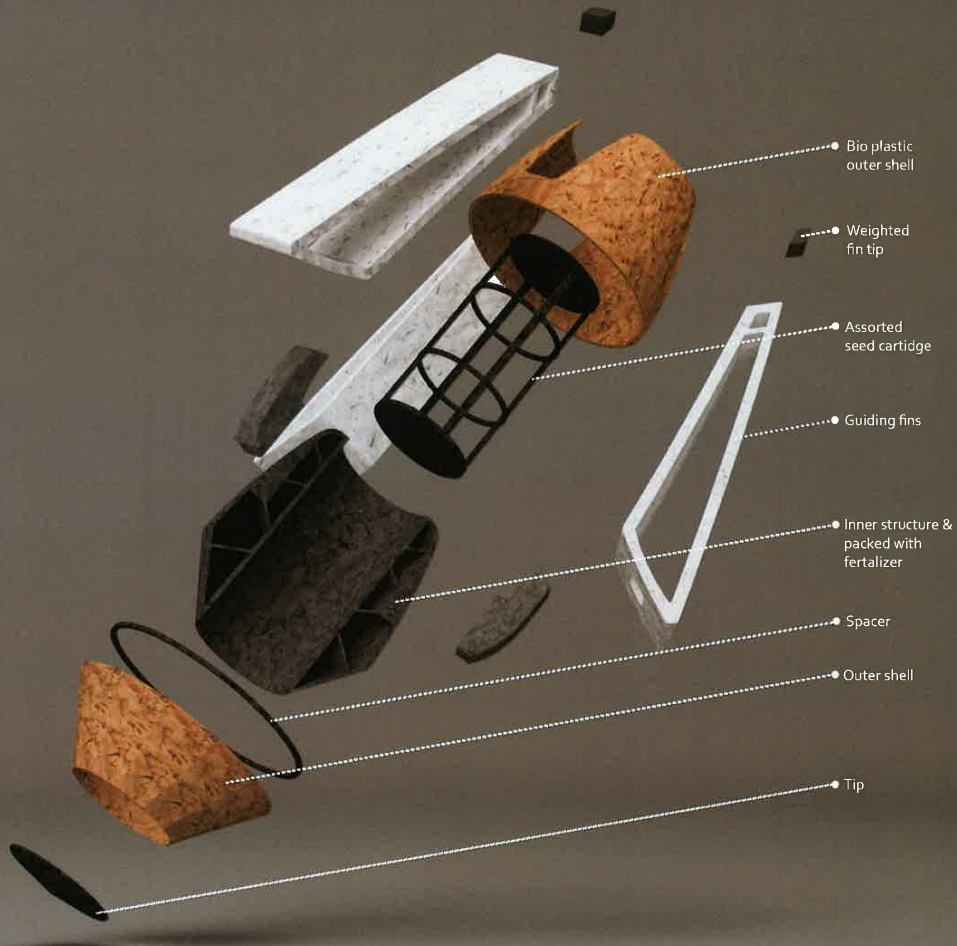
Each seed capsule contains **Cristal Rain** and **Osmocote** fertilizers. **Cristal Rain** improves soil moisture retention, while **Osmocote** releases key nutrients like nitrogen, phosphorus, and potassium over time to support steady, healthy growth.



The **seed mix** typically includes native species such as **kānuka**, **mānuka**, **cabbage tree**, **coprosma**, **carex virgata**, and **flax**. These species are ideal for restoration as their seeds are microscopic once cleaned, allowing a larger quantity to fit into each capsule. The **mix is fully customisable** and can be tailored to suit specific environments or project goals.

insert material

The seed capsule is made from a new compressed bio-waste material that Jane from Scrub Growers Limited (mum) is helping to develop and test. It naturally decomposes in around 1-2 months when exposed to the elements, making it ideal for protecting seeds during dispersal while leaving no harmful residue.



Product Naming

KākanoRere – “Flying seed.”

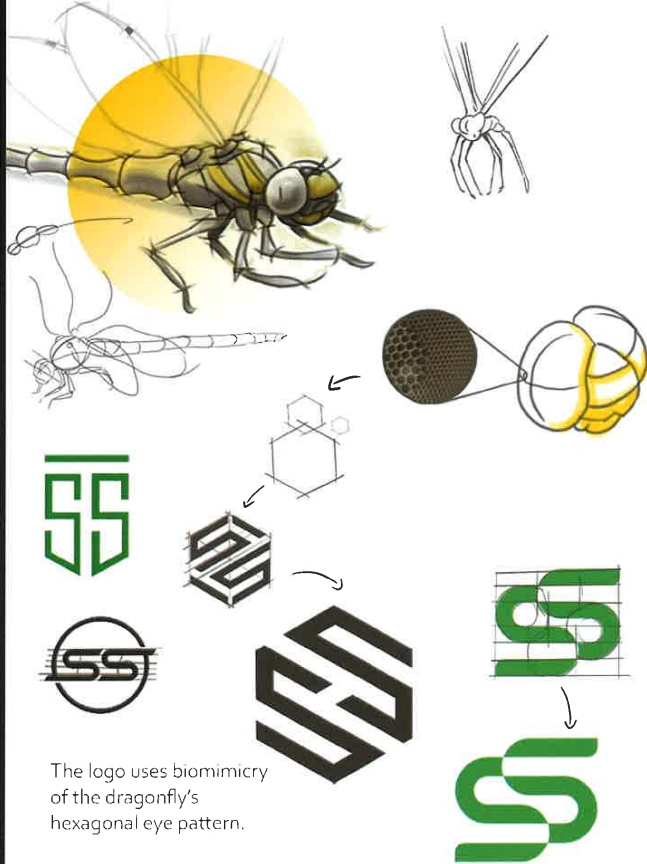
SwiftSeed – Emphasizes both speed and function.

RākauRere – “Flying tree/plant.”

BioDrop – For “biological payload drop.”

Logo Development:

Swift Seed



The logo uses biomimicry of the dragonfly's hexagonal eye pattern.

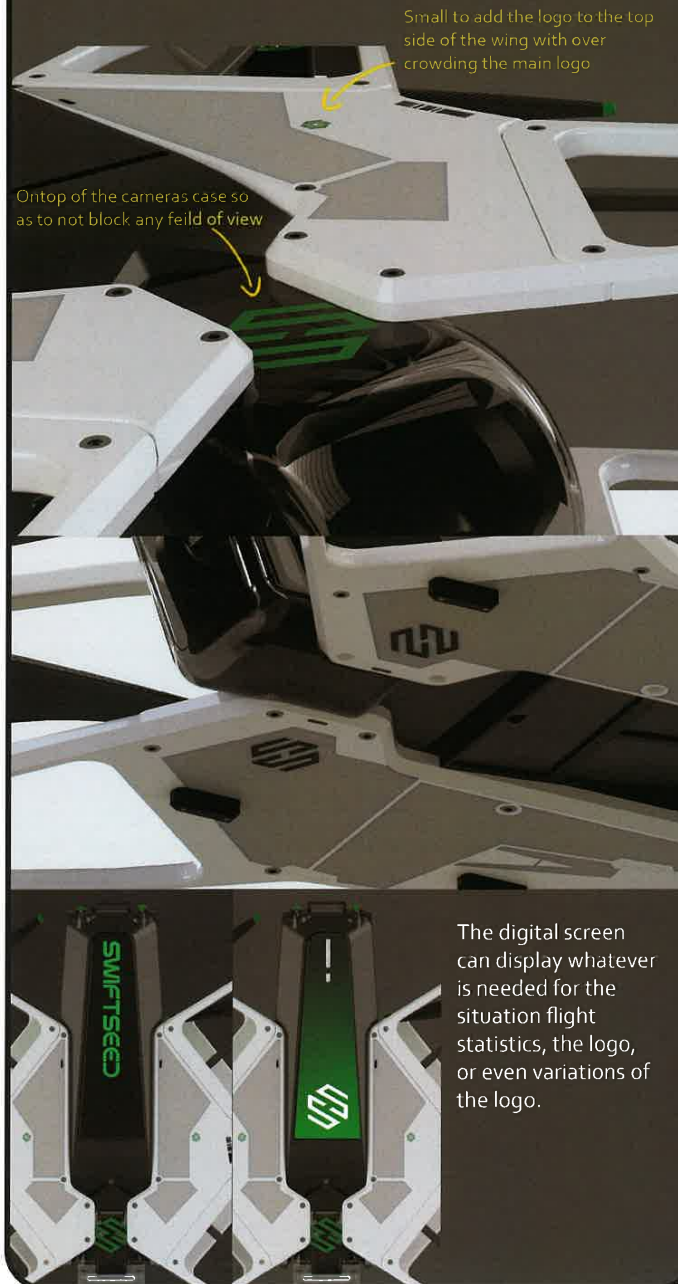
Text Selection

SWIFTSEED
SWIFTSEED
SWIFTSEED

Brings a clean, modern feel that conveys advanced, reliable technology. The curved lettering complements the rounded corners throughout my portfolio for a cohesive look.

Location on Design

The logo must be visible both in flight and, most importantly, when the drone is on the ground. To ensure it stands out against the black-and-white body, it will be displayed on the top in green.



App design



“ I see digital interfaces and autonomous drones as the future of native plant restoration and maintenance. They could make the process **faster**, more accurate, and far more efficient. With **real-time data** and **automated planting**, we can cut labour costs, improve precision, and increase profit margins, all while scaling restoration in a sustainable way.

— Rodney Straka Co-Founder of Scrub Ecology

scrub

ECOLOGY IN ACTION

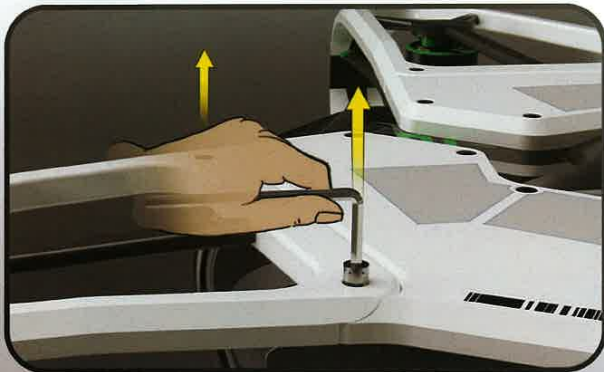


4k Camera

Digital Integration

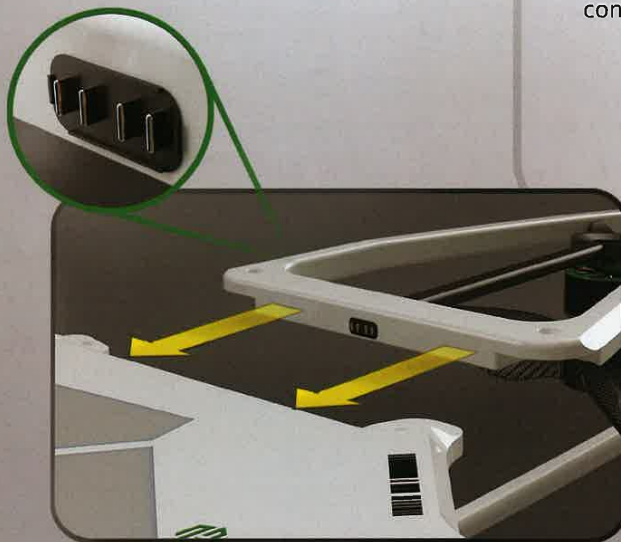
Each drone connects to an **app** for full control and **live monitoring**. Through a **4k camera** Using **GPS mapping**, AI flight control, and real-time data, it automates planting and tracking. The **AI analyses terrain**, soil, and moisture to place seeds for best growth. With automated release and environmental sensing, it makes restoration faster, more accurate, and sustainable.





The wings are fully detachable with a single hex key for easy transport or replacement, this allows the entire drone to pack down neatly into a single case for travel between job sites.

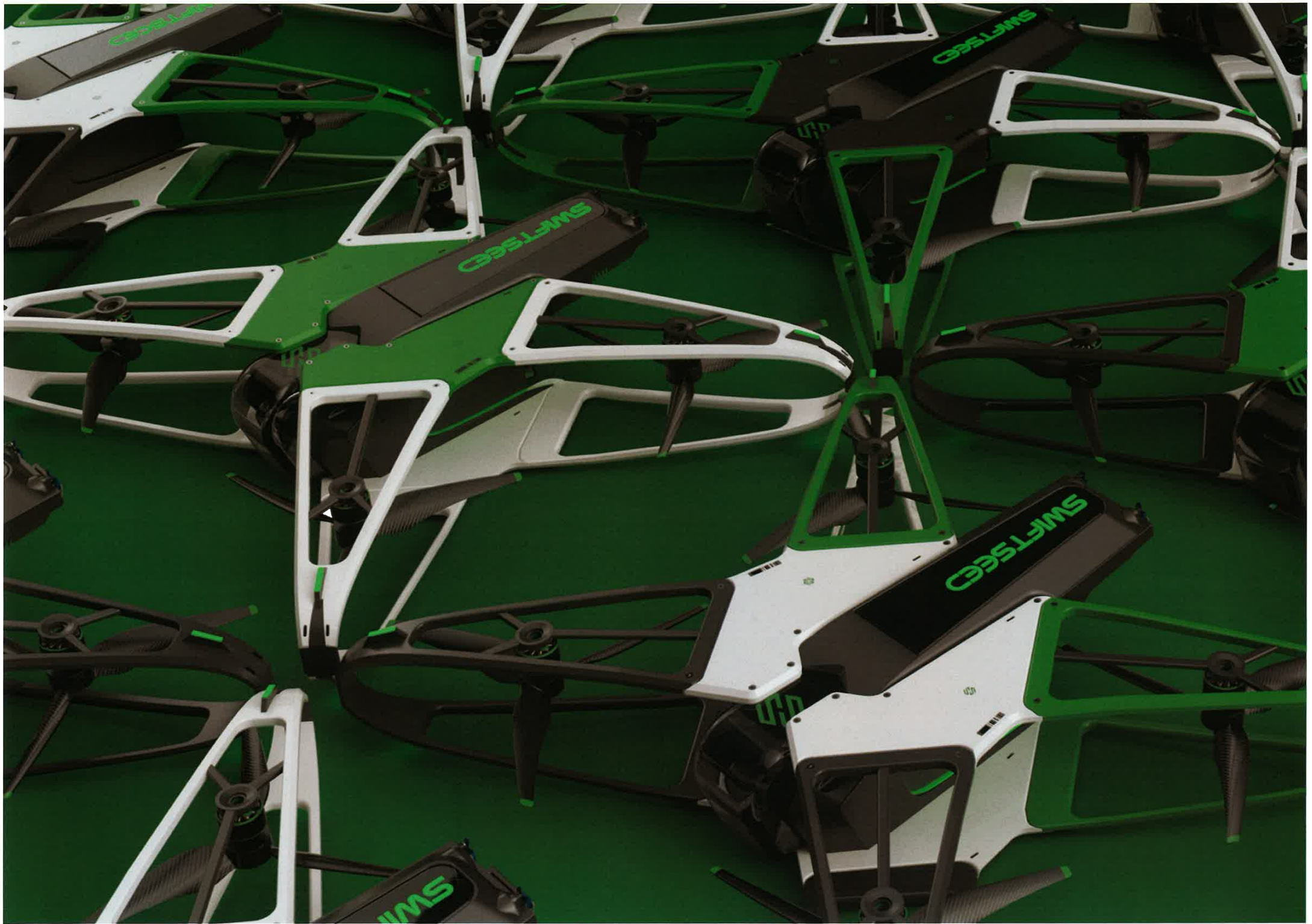
release system with an integrated electrical connector, allowing the motor wires to disconnect cleanly without needing to be rewired each time.



CUSTOMISABLE

Fully customisable wings designed to suit different needs, including aesthetics, strength, weight, and performance in varying flight conditions.





4K Infrared Gimbal Camera

A high-resolution 4K infrared gimbal camera provides clear imaging in both daylight and low-light conditions, offering stable footage and precise environmental scanning.

Wing Material Section

Lightweight plastic wings feature an optimized internal infill pattern that maximizes strength while minimizing material use. This design ensures the drone stays under the 25 kg Maximum Take-Off Weight (MTOW) limit required for Part 101 operations.

Digital Screen

Displays key flight information such as battery levels and crucial planting data, allowing for real-time monitoring and performance tracking.

Latch

Secure locking mechanism that holds the battery and payload firmly in place during flight, ensuring safety and stability throughout operation.

Brushless Motor

Lightweight and highly efficient, the brushless motor provides reliable power generation, making it ideal for maximizing flight performance and battery life.

Propeller Tips

Green-tipped propellers create a visible outline when spinning, making the rotation area clearer and reducing the risk of accidental contact or injury.

Landing Feet

Removable and replaceable landing feet prevent the wings and body from contacting the ground, protecting key components during takeoff and landing.

Wing Reinforcement

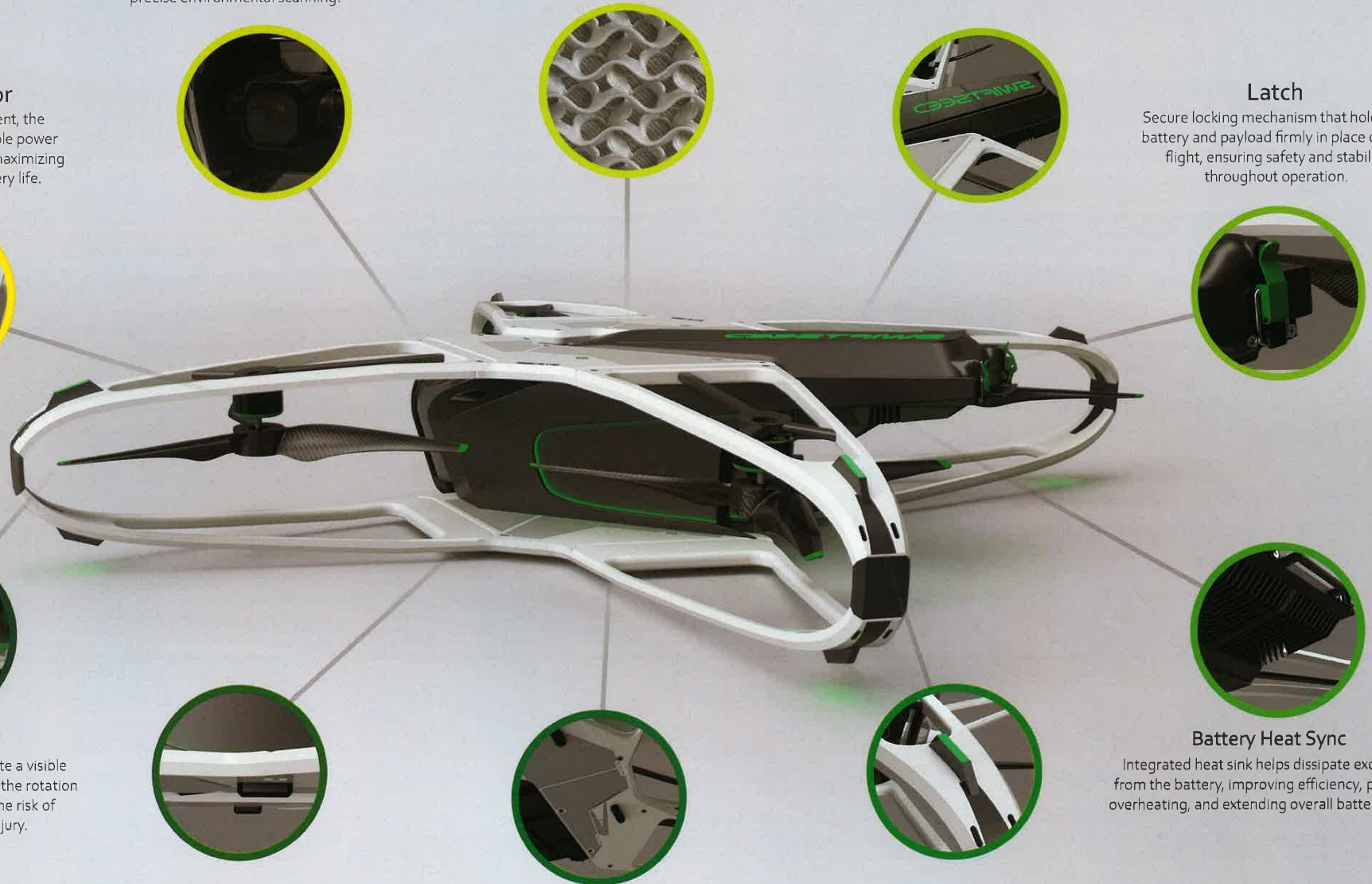
Aerospace-grade aluminum inserts strengthen the large wings, providing durability and rigidity in all conditions. This added stability is essential for precise planting and maintaining smooth flight performance.

LED Strobe Light

A high-visibility strobe light meets government regulations for night flight. It allows the drone to operate after daylight hours, working alongside the infrared camera.

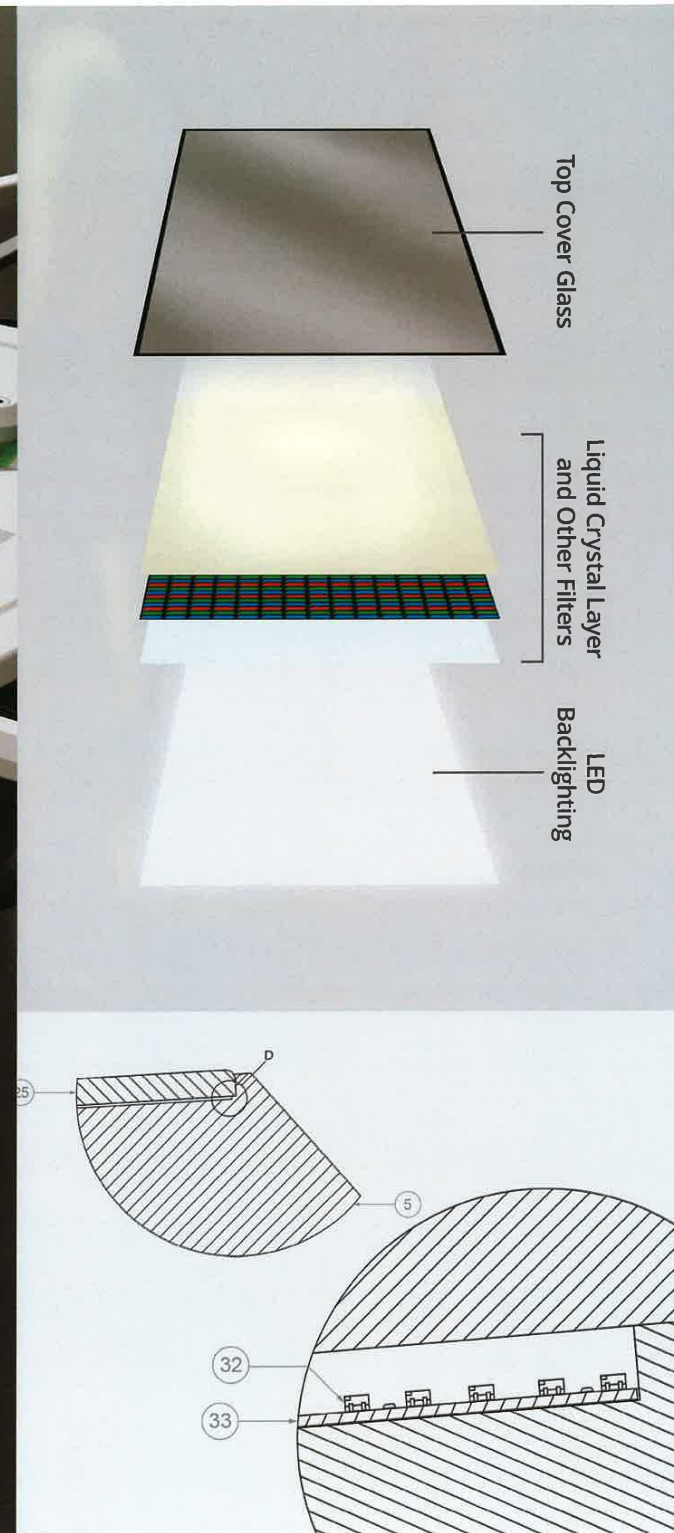
Battery Heat Sync

Integrated heat sink helps dissipate excess heat from the battery, improving efficiency, preventing overheating, and extending overall battery lifespan.





The digital screen displays key information, designed mainly for when the drone has landed so everyone, not just the operator, can view flight statistics without checking a phone. The operator can also send live progress updates to people off site.



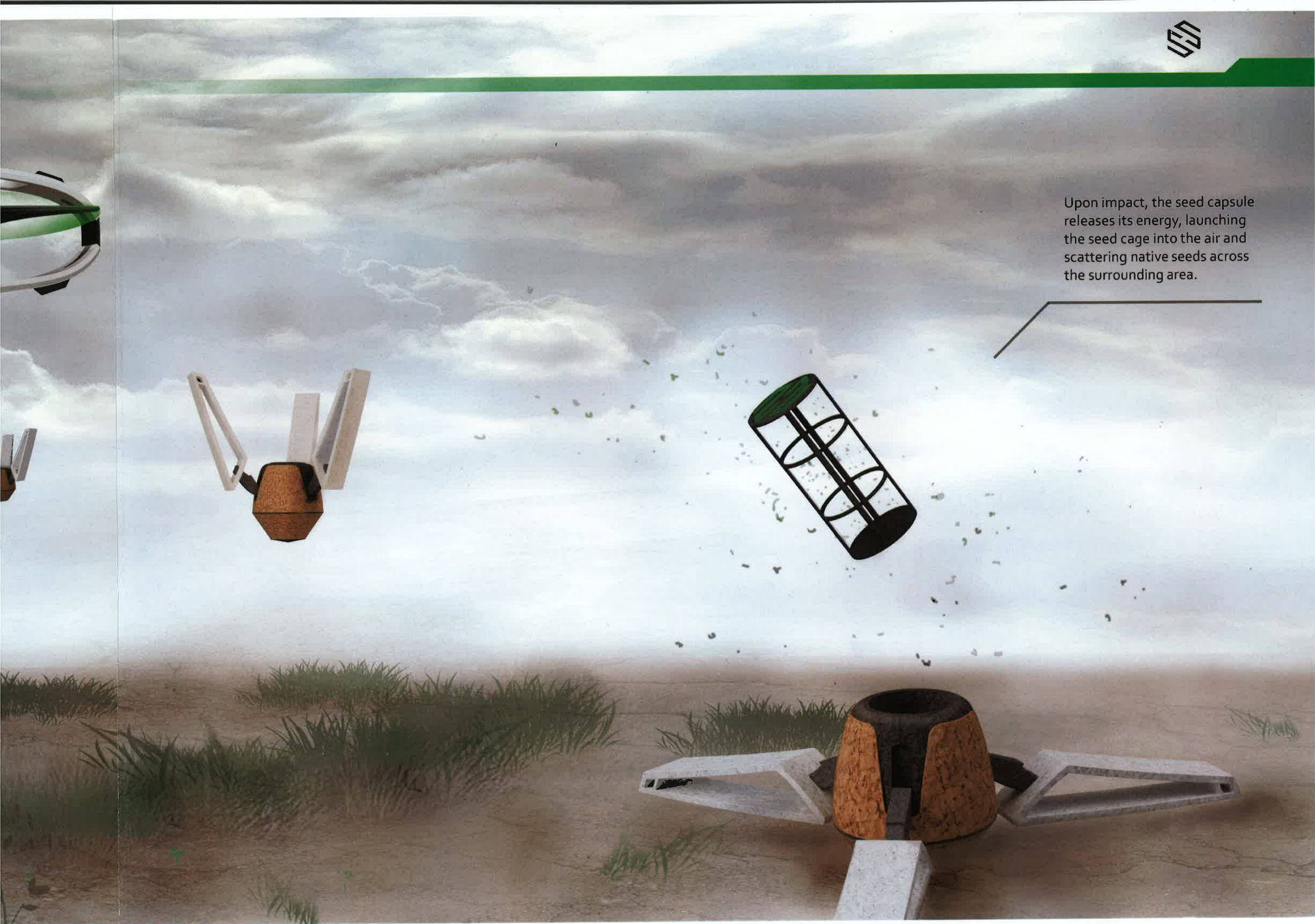


Decomposing Seed Capsule





Upon impact, the seed capsule releases its energy, launching the seed cage into the air and scattering native seeds across the surrounding area.



EXHIBITION

SPACE ANALYSIS

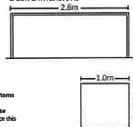
Location One



Board Dimensions

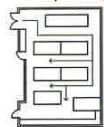


Desk Dimensions



The panels provide a large space that forms can be attached to hanging elements up to eye level for the observer. Smaller panels will be hanging around the space this is ideal height

Room Floorplan



Location One

the location is very near the entrance meaning it would be seen straight away and have plenty of natural lighting and have a nice feel by being in the corner near to the window

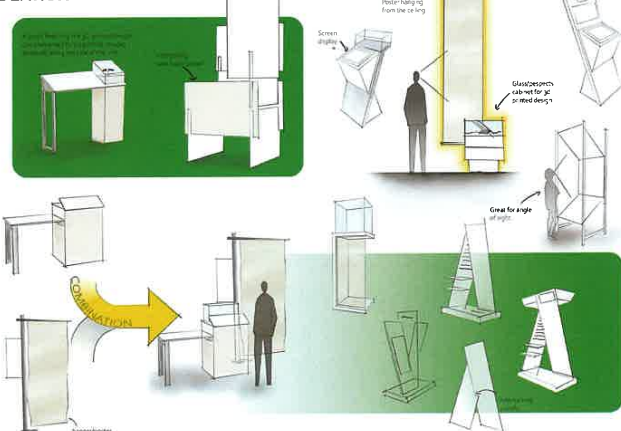
Location Two

is a bit further from the entrance as well as the view from the entrance as it will need to be different and look to stand out and artificial lighting needs to be added

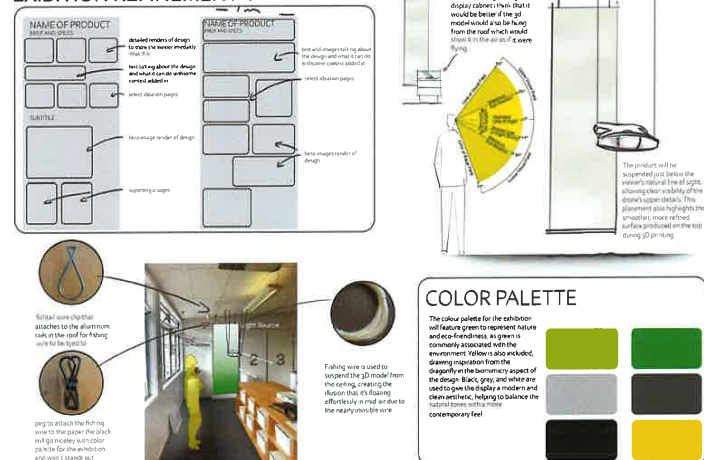
Location Two



IDEATION



EXHIBITION REFINEMENT 1



3d model development



Personal Evaluation

- + The 3D-printed model effectively showcases the overall design, leaving no doubt about the drone's form or structure.
- While the function of the design is clear, it could be made more obvious what the drone actually does.
- The most informative drawing showing the drone's key features and how the seed pod operates is placed too low, making it difficult for viewers to see easily.
- + The exhibition's darker colour scheme stands out from others, drawing strong attention and creating a bold visual impact.
- The text size is slightly too small, which may make it hard for viewers of all ages to read comfortably.
- + The working drawings clearly highlight the drone's features and successfully incorporate human factors.
- + The technical drawings communicate that every component has been carefully considered and that the drone could realistically function.
- + The renderings are refined, detailed, and visually impressive.
- The section explaining the app could be improved to more clearly show how it functions.
- + The logo and product name are well-presented visible and recognizable without being overpowering.

Viewers Feedback

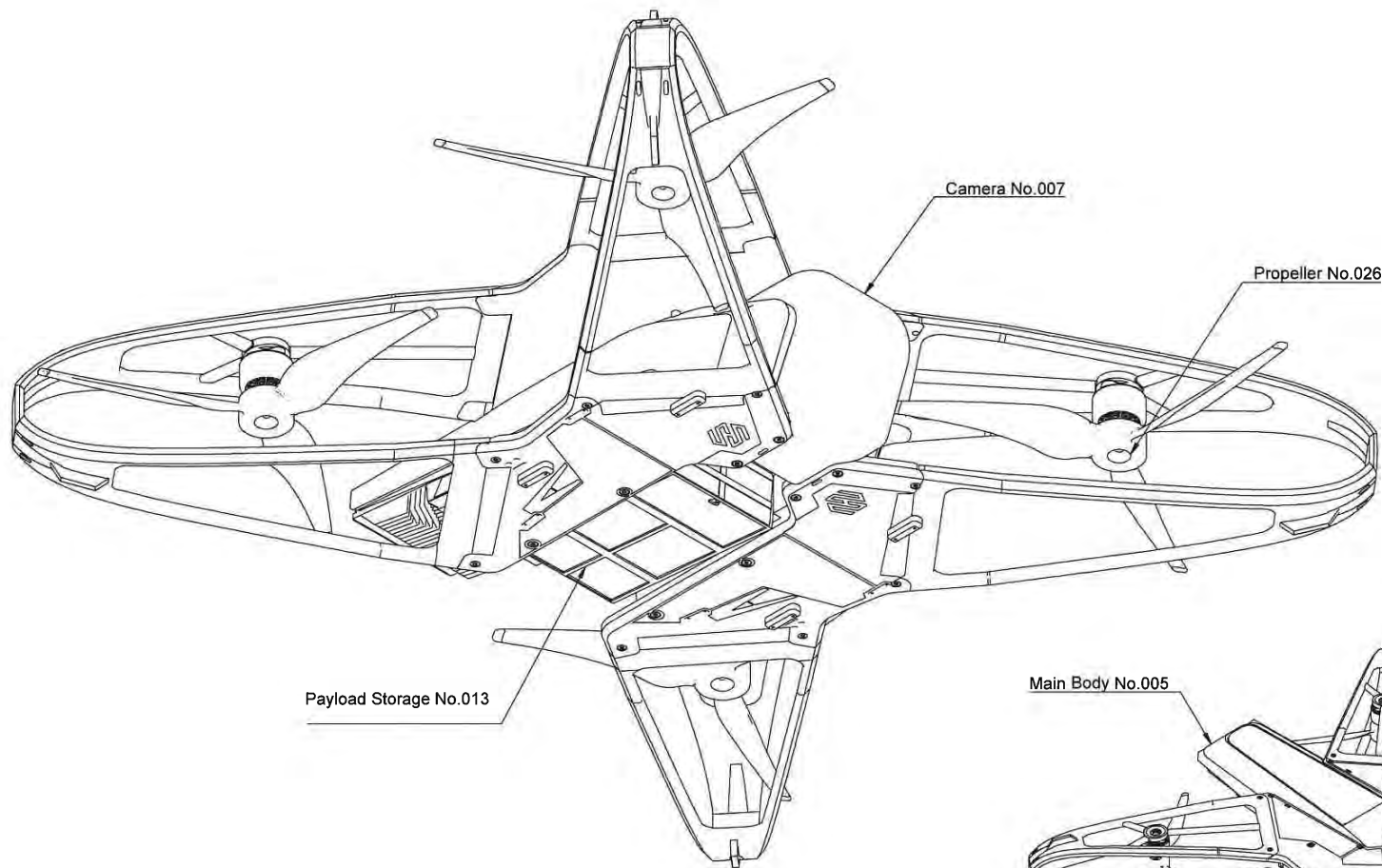
- great visual impact
- larger text
- more information on what it does
- the composition and rendering are high quality.
- 3d model is amazing
- banner tiny bit too low
- the painting on the model is not sanded down, to make it more professional.

Summary

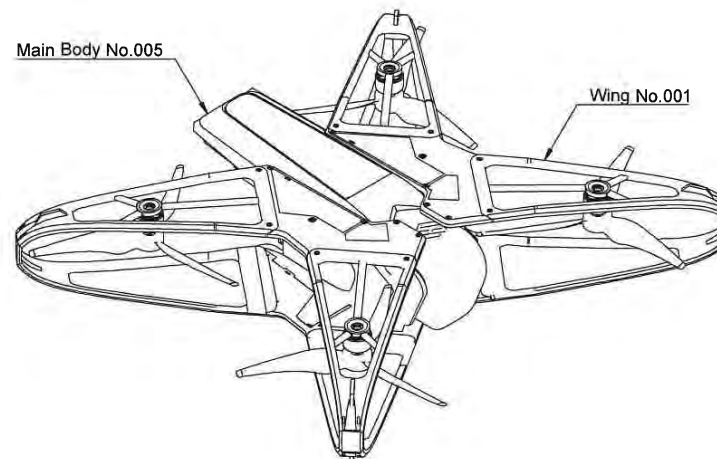
Overall, the exhibition went very well and clearly communicated my design ideas. The darker colour scheme and refined renderings made the display stand out, while the 3D model helped viewers easily understand the drone's form and construction. Feedback was positive, highlighting the strong visual impact and high-quality presentation. However, there were a few small oversights such as text size, placement of key drawings, and some areas on the model that could be finished more neatly. These minor issues aside, the exhibition successfully showcased my design process and final concept.

Finished Design



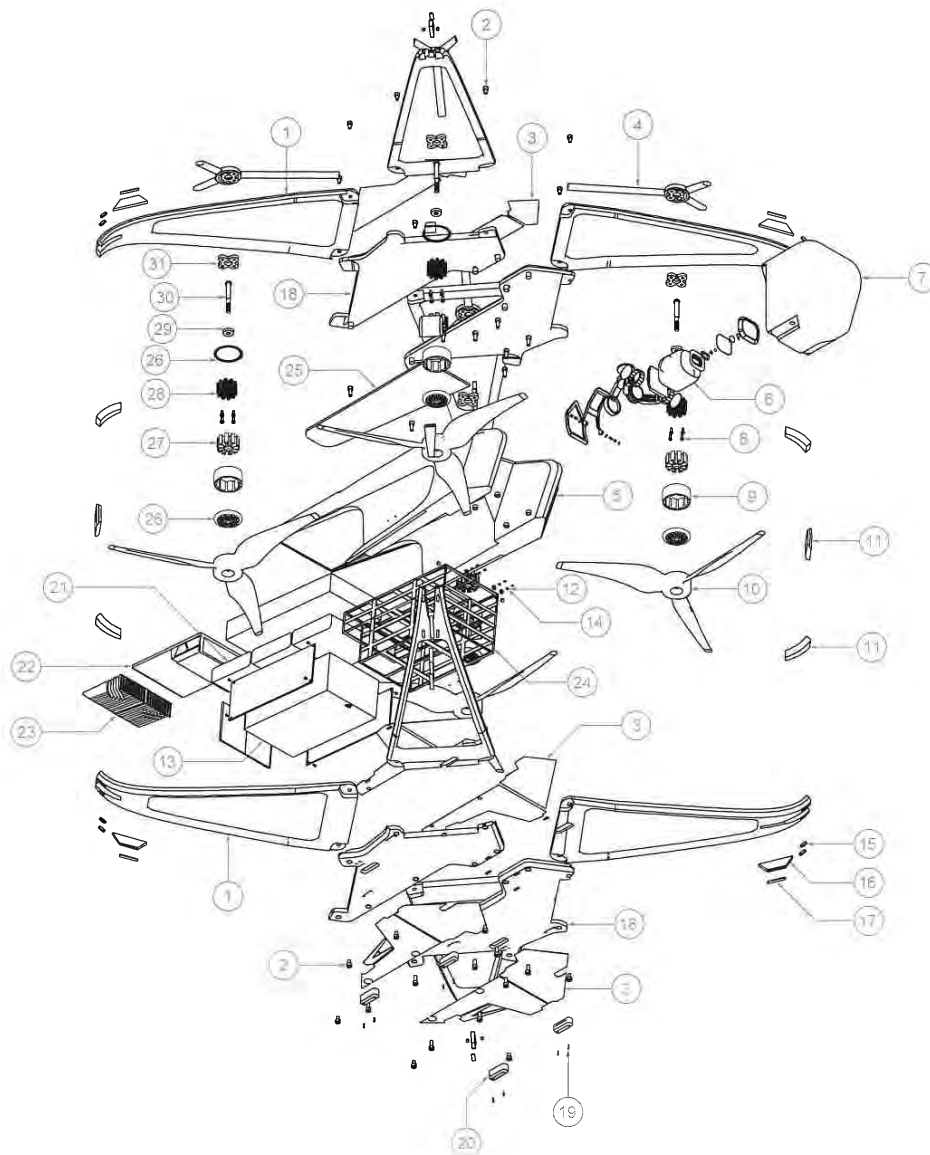


BOTTOM VIEW 1:5



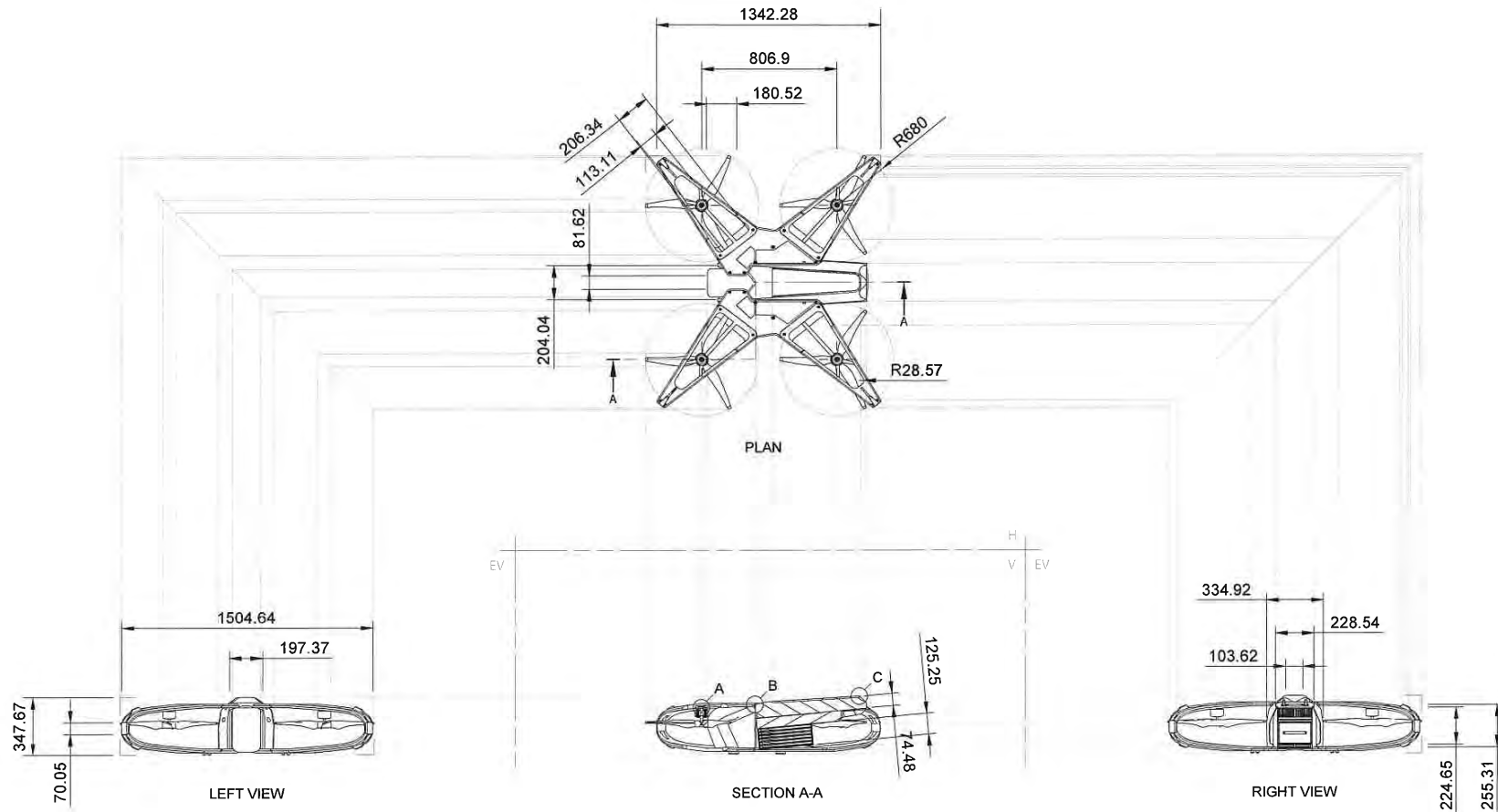
TOP VIEW 1:10

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scale	Various	Sheet 1/7



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1	1	WING	PLASTIC
2	32	HEXAGON CAP SCREW 20mm	ALUMINIUM
3	14	REINFORCING PLATE	POLYCARBONATE
4	8	WING SUPPORT	PLASTIC
5	1	MAIN BODY	PLASTIC
6	1	CAMERA BODY	PLASTIC
7	1	PROTECTIVE CASE	GLASS
8	16	ROUND HEAD SCREW 14.8mm	ALUMINIUM
9	4	STATOR MAGNET	IRON & COPPER
10	4	PROPELLA	CARBON FIBER
11	4	WING CONECTOR	PLASTIC
12	4	CATHODE	COPPER
13	1	PAYLOAD STORAGE	POLYCARBONATE
14	4	CATHODE INSULATION	RUBBER
15	16	CONECTOR CAP	POLYCARBONATE
16	8	FIN	PLASTIC
17	8	FIN LED	LED
18	4	BOTTOM WING	PLASTIC
19	8	COUNTERSUNK RIVET 7mm	ALUMINIUM
20	4	LANDING FEET	POLYCARBONATE
21	3	BATTERY	LITHIUM
22	2	BATTERY CASE	POLYCARBONATE
23	39	COOLING FIN	ALUMINIUM
24	1	BATTERY CASE	ALUMINIUM
25	1	DIGITAL DISPLAY	GLASS
26	4	MOTOR GUARD	PLASTIC
27	4	CORE	IRON
28	4	WINDING	COPPER
29	4	BEARING	ALUMINIUM
30	4	ROUND HEAD BOLT 94mm	STAINLESS STEEL
31	4	ATTACHMENT BRACKET	PLASTIC

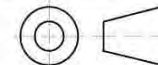
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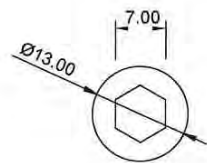
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4	8	WING SUPPORT	PLASTIC
5	1	MAIN BODY	PLASTIC
6	1	CAMERA BODY	PLASTIC
7	1	PROTECTIVE CASE	GLASS
8	16	ROUND HEAD SCREW 14.8mm	ALUMINIUM
9	4	STATOR MAGNET	IRON & COPPER
10	4	PROPELLA	CARBON FIBER
11	4	WING CONECTOR	PLASTIC

PART LISTS			
ITEM	QTY.	PART NAME	MATERIAL
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13	1	PAYLOAD STORAGE	POLYCARBONATE
14	4	CATHODE INSULATION	RUBBER
15	16	CONECTOR CAP	POLYCARBONATE
16	8	FIN	PLASTIC
17	8	FIN LED	LED
18	4	BOTTOM WING	PLASTIC
19	8	COUNTERSUNK RIVET 7mm	ALUMINIUM
20	4	LANDING FEET	POLYCARBONATE
21	3	BATTERY	LITHIUM

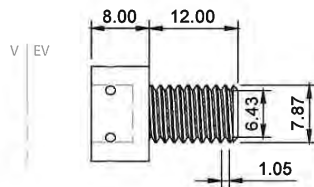
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23	39	COOLING FIN	ALUMINIUM
24	1	BATTERY CASE	ALUMINIUM
25	1	DIGITAL DISPLAY	GLASS
26	4	MOTOR GUARD	PLASTIC
27	4	CORE	IRON
28	4	WINDING	COPPER
29	4	BEARING	ALUMINIUM
30	4	ROUND HEAD BOLT 94mm	STAINLESS STEEL
31	4	ATTACHMENT BRACKET	PLASTIC



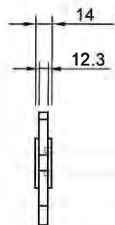
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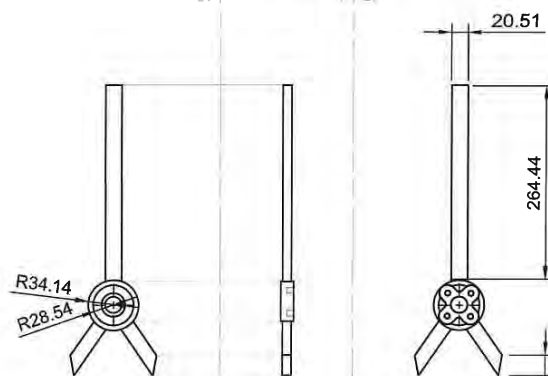
PART 2
FRONT VIEW
2:1



RIGHT VIEW



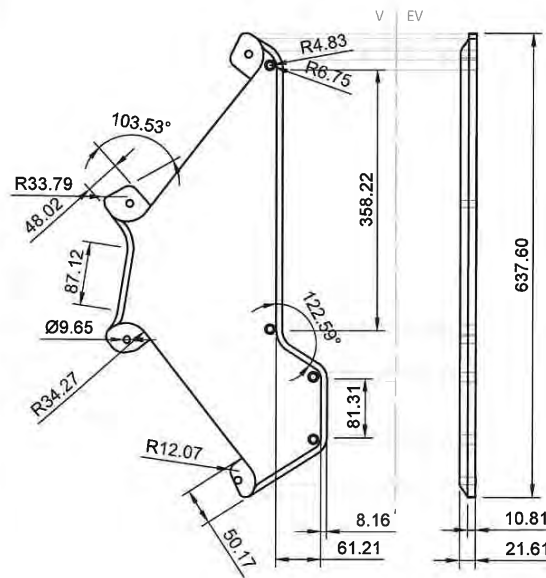
TOP VIEW



LEFT VIEW

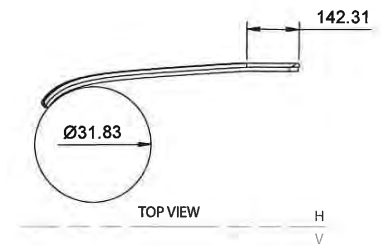
PART 4
PLAN VIEW
1:5

RIGHT VIEW

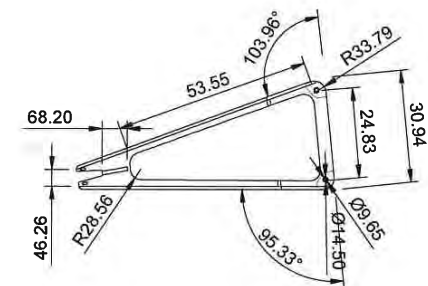


PART 1 PLAN VIEW 1:5

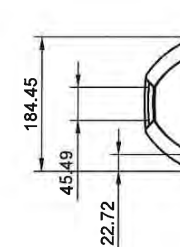
RIGHT VIEW



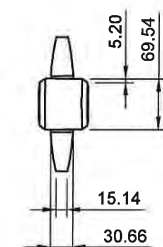
TOP VIEW



PART 1 PLAN VIEW 1:10



LEFT VIEW



PART 11
FRONT VIEW
1:5

PART LISTS			
ITEM	QTY.	PART NAME	MATERIAL
1	1	WING	PLASTIC
4	8	WING SUPPORT	PLASTIC
11	4	WING CONECTOR	PLASTIC
13	1	PAYLOAD STORAGE	POLYCARBONATE
14	4	CATHODE INSULATION	RUBBER
15	16	CONECTOR CAP	POLYCARBONATE
16	8	FIN	PLASTIC
17	8	FIN LED	LED

Document type
Parts Drawing

Title

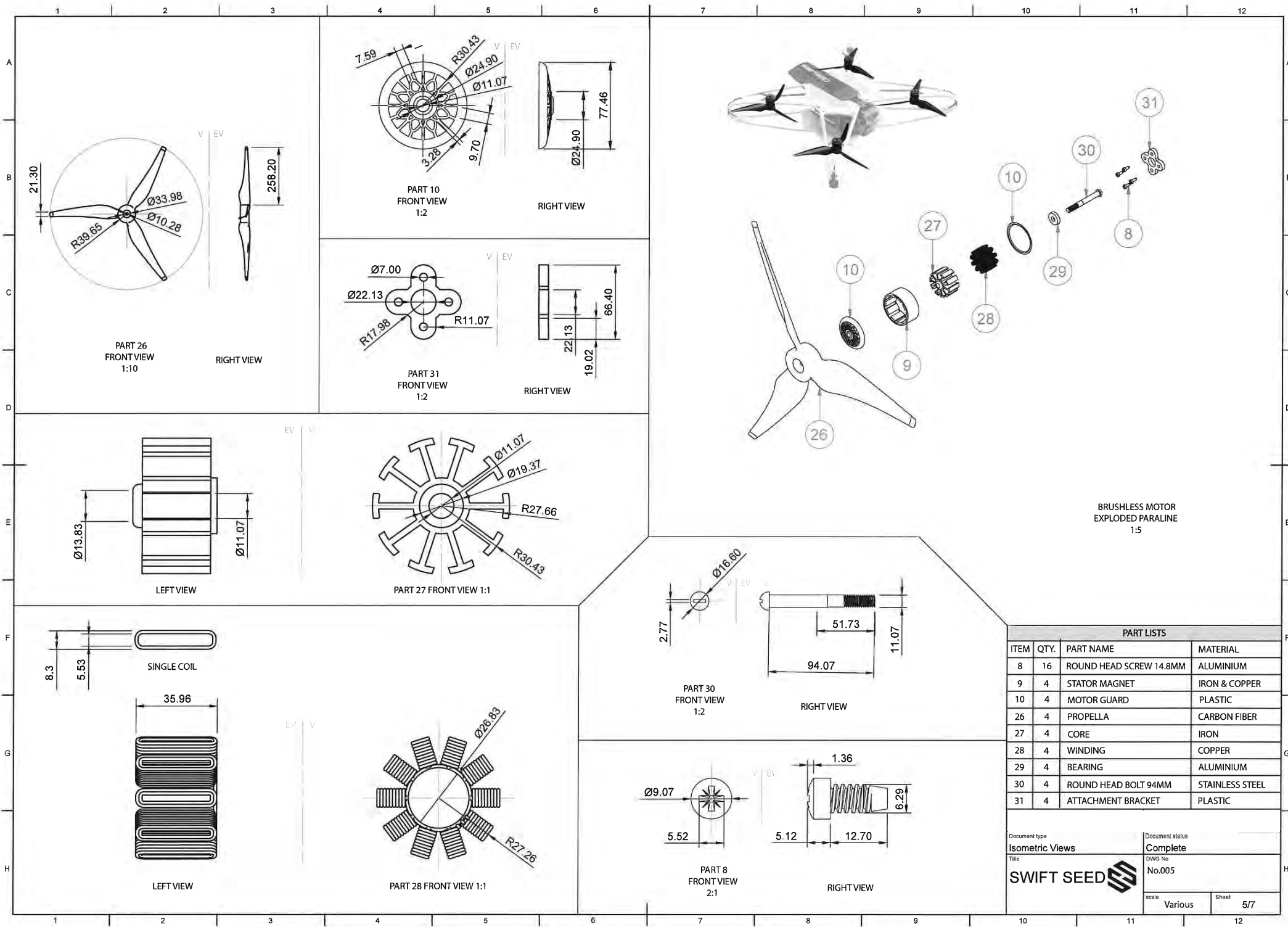
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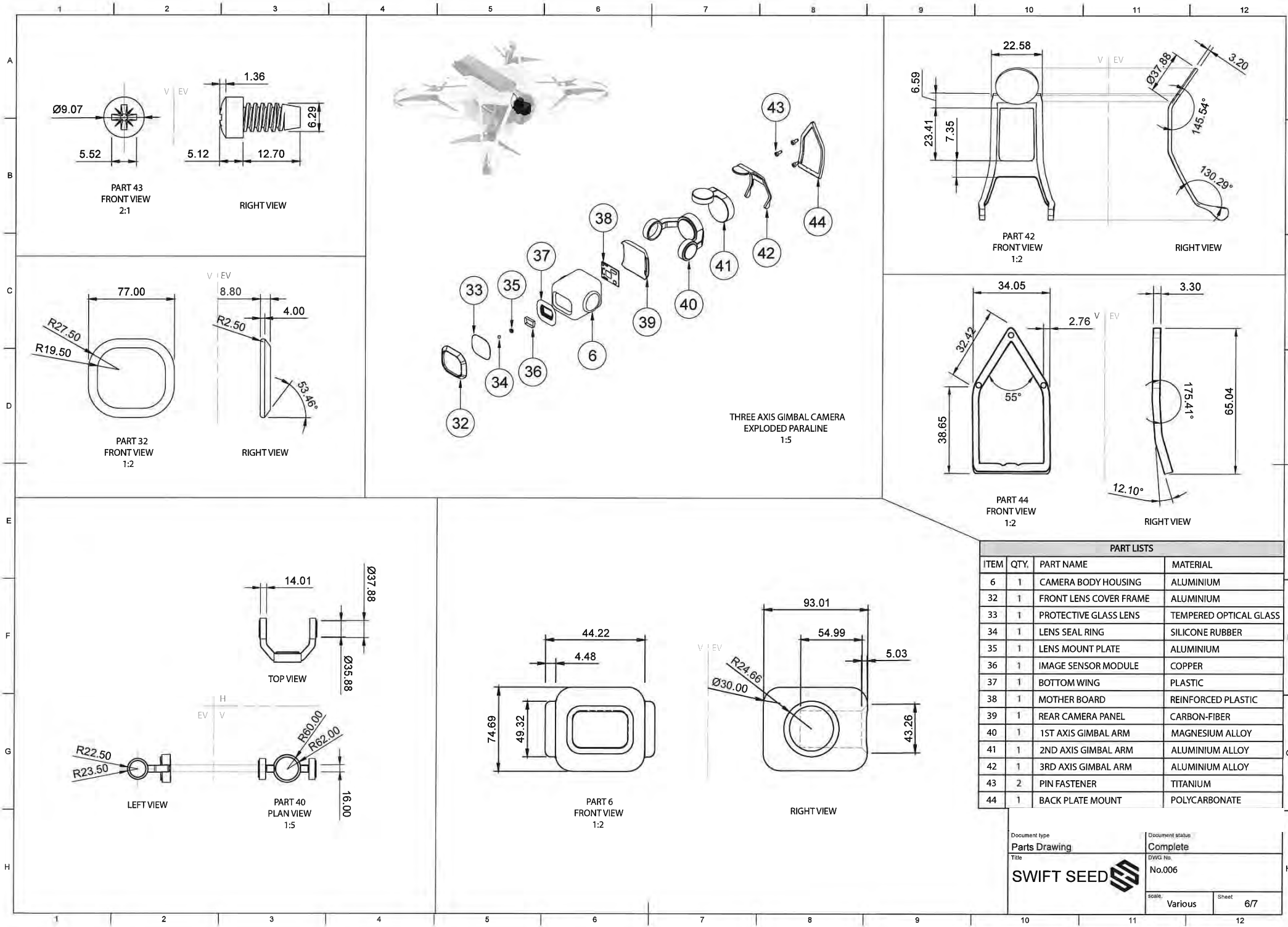
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4/7



PART LISTS			
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8	16	ROUND HEAD SCREW 14.8MM	ALUMINIUM
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10	4	MOTOR GUARD	PLASTIC
26	4	PROPELLA	CARBON FIBER
27	4	CORE	IRON
28	4	WINDING	COPPER
29	4	BEARING	ALUMINIUM
30	4	ROUND HEAD BOLT 94MM	STAINLESS STEEL
31	4	ATTACHMENT BRACKET	PLASTIC

Document type	Document status
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Title	DWG No
SWIFT SEED	No.005
scale	Sheet
Various	5/7



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32	1	FRONT LENS COVER FRAME	ALUMINIUM
33	1	PROTECTIVE GLASS LENS	TEMPERED OPTICAL GLASS
34	1	LENS SEAL RING	SILICONE RUBBER
35	1	LENS MOUNT PLATE	ALUMINIUM
36	1	IMAGE SENSOR MODULE	COPPER
37	1	BOTTOM WING	PLASTIC
38	1	MOTHER BOARD	REINFORCED PLASTIC
39	1	REAR CAMERA PANEL	CARBON-FIBER
40	1	1ST AXIS GIMBAL ARM	MAGNESIUM ALLOY
41	1	2ND AXIS GIMBAL ARM	ALUMINIUM ALLOY
42	1	3RD AXIS GIMBAL ARM	ALUMINIUM ALLOY
43	2	PIN FASTENER	TITANIUM
44	1	BACK PLATE MOUNT	POLYCARBONATE

Document type	Document status
Parts Drawing	Complete
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