



**The Time of the Drone is NOW!**

# Tararua District Council – (a few facts)

- Area of 4,360.56 km<sup>2</sup>
- Population of 17,800 as at June 2017 – and rising steadily
- One of the largest road networks in New Zealand - (approximately 2,000 kms)
- Network includes two alternate routes to SH3 – Manawatu Gorge (both now functioning as State Highways due to closure of gorge)
- Over 400 bridges
- 6 distinct service regions
- 4 operating service centres
- 10,193 rateable properties – but dropping due to mass amalgamations



# Technology is advancing exponentially everyday

- 1896: First use of UAVs using cameras for surveillance
- 1969: The first demonstration of a digital camera
- 1974: Aerospace manufacturing company Karem Aircraft Inc creates “Amber”
- 1988: Sony introduces the MVC-C1 - the first consumer model of their MAVICA video cameras
- 1994: SanDisk and Kodak releases the first CompactFlash Memory Card
- 2000: The development of "microlens array" technology, allowing the production of higher megapixel image sensors
- 2002: CIA first uses unmanned predator drone in a targeted killing
- 2012: Light field camera on sale that measures distance and angle, allowing photos to be refocussed, after they are taken
- 2014: Drones/quadcopters become widely available for “public” use
- 2015/16: Camera achieve 5 trillion+ frames per second another achieves 3,200 Mega Pixels
- 2018: Donald Trump initiates production of micro-drones self-autonomous swarm capable with AI facial recognition for personal assassination. What could possibly go wrong?



# Drones – Fun distraction or working tool?

(a.k.a. – Nice to have ... or ... Need to have?)

- Yes, drones can be fun, but...
- Drones are very functional!

## **A picture says a thousand words.**

- After 8 months we have 132 GB of video libraries now to prove this
- We contend: Drones have a place in any council's day to day service to the public –in a nice way 😊
- They save money & rates:
  - Improved Efficiency – time saving
  - Improved Planning and Decisions
  - Improved Safety
  - Improved Quality of Data
  - Great for Governance



# What we had...

## Prior drone capabilities:

- One drone "accessible"
- Hobbyist, trained users available
- Or outsource to consultants/specialists

## Limitations:

- Minimal functionality – limited results
- Scheduling issues for equipment
- Staff availability – (interruptions to BAU)
- Or just expensive



# The Project: What we need

## Preferred drone capabilities:

- Multiple drones for different conditions
- Several staff trained in drone use, plus
- One dedicated drone operations role
- Software tools
- GIS and engineering applied use

## Benefits:

- Increased functionality and purpose
- Back-up and ability to cover multiple sites for an emergency event
- Availability – able to work on improving data for mapping as BAU



**Perhaps in the next budget?**

# The Planning – This Project Pushes Boundaries –RISK!

- 2016, external expert, Tony K employed to review validity of concept
- Preliminary assessment is excellent (Drones are NOT a dumb idea)
- 5x staff sent to introductory training day at Raglan by NZ's Aeronavics
- Market and industry research including national RPAS conference
- Trials of locally sourced drones undertaken and of consultants drones
- Engineering capacity developed for AutoCAD design & GPS systems
- Project assessment to CE, with project “kick start” approved
- Management and IT undertake strategy workshop on drone project
- Funding mechanisms found, procurement planning determined,
- Policy & procedure papers, job description developed
- 4 x people trained at Massey University
- 1 “Projects Specialist” employed – dubbed “James Bond” by the Mayor!

# Total Resource Planning and Implementation



- External security expert
  - Project Management consultant (project auditor role for CE)
  - Downer NZ – 6 staff
  - Tararua District Council – 11 staff
    - 4 x Senior managers & CE
    - 6 x IT staff for project review
  - Target workload: 3 hours flying time a week
    - Current direct operational cost approx. \$55k-\$60k
- Ongoing:
- Four in permanent qualified capacity



# Project Management:

## Business Case:

- Identify uses for drones targeting “killer apps” for most savings and efficiencies
- Consider the security and legal requirements
- Benefits of a permanent drone operator role and how to scale this up
- Identify level of service
- Identify drone capacity required
- Identify peripheral equipment required & procurement plan
- Convince CE of the benefits of the role
- Convince Councillors of the benefits of the activity/service
- Convince staff it is not a toy

# Benefits:

## Improvements in service

- Asset inspections
- Dramatic increase in surveying capabilities
- Imaging and mapping – (Improved quality and volume of data)
- Monitoring coastal erosion
- Marketing images from public events
- Search & Rescue
- Civil Defence & Emergency Management responses
- Reduces costs for aerial imagery & flight operations

## Improvements in safety

- Allows planning - for all to see
- Improves access over difficult terrain
- Reduces need to close public roads for inspections
- Removes or minimises risk to Inspectors



**Innovation:** Taking “Drone Capability” to the next level

**Job Description:** ~~“Fly Drones”~~

**“Projects Specialist Role” – not the ‘drone guy’**

- Dedicated role with multi-level responsibilities
- Leading purpose of role is:
  - “to manage Council’s drone/RPAS activities, both public facing and internally”
- This includes:
  - Development of Public Drone policy
  - Working with the public to promote appropriate use of private drones
  - Provide service to third parties:
    - Emergency Services
    - Shared Services MW LASS
  - Continued development of the role to ensure continued improvement of services

# The Challenge:

## Perception: “Boys and their Toys”

- TDC does not have a magic money tree – although we wish we did! But we had a \$50k IT development budget, untapped
- Introduction of any new FTE is always a challenge
- New Planner or Project Manager or Compliance Specialist versus Drone Flyer – not a guaranteed “slam dunk”
- CE was on board from the start, but
- Councillors needed convincing – (not about the FTE but the overall concept of drone capabilities)
- Business Plan would need to be irresistible!



# Success:

Goal: Development and implementation of a Project Specialist role to provide improved services using drone technology.

The first measurable success came in October 2017 when Ray Borrie was appointed as Tararua District Council's first in-house drone operator.

The functions of the role are being put into practice step-by-step as expertise and procedures are developed, tested and applied.

The Killer App was identified: Bridge inspections – risky, people intensive, weather dependent, annoying to commuters and so expensive. We have over 400 bridges. You can't even do one a day.



# Success:

The value of the role is proven:

- It takes about 1 to 2 hours to capture the information that 2 people for 8 hours would achieve
- Half of the small drone capital cost was paid for in 15 minutes of fly time
- Health and safety has been hugely enhanced on planning difficult jobs
- Great software renders amazing images onto large TVs, and transferrable
- Engineering tools employed for planning and design
- Governance decisions have been made easier by identifying scale and extent of geological issues
- PIX4D World “Model for the Week” on Blog– Dannevirke Settler’s Cemetery



# Success:

To date the drone has not been used for bridge inspections! (we have been too busy)

But it has been used for:

- Mapping of road washouts
- Construction site planning and progress updates
- Assessing land mass movement,
- Finding alternate road routes for climatic events,
- Mapping cemeteries – PIX4D world “Image of the Day”,
- Forest block status,
- Identifying sites of cultural significance,
- Conservation planning for river and wetland development, and...



## Video One: Pahiatua Fire Event

At a recent fire event in Pahiatua the drone was used for the identification of hot spots



## Video Two: Akitio Seawall

The video is able to show the seawall from a perspective that could not be achieved from the road.





# Transferable?

## Does your council:

- want to offer the best possible service?
- want the best possible data?
- want staff to work in an efficient and safe way?
- want to support Emergency Services in an event?
- want to futureproof processes?
- embrace technology and welcome change?
- Have happy Councillors that can make sensible decisions?
- Want a TV in your office, in fact, one everywhere?

**Yes? Then call us ... because it can be done!**



# What Next?



## LTP

- Year 1 - Further Development Budget
- The “big” drone – All weather and/or Micro-drones for internal building inspections
- Camera for RGB readings (water/plant detection)
- Renewals! Yes, already...
- Year 2 – LIDAR Development –if the price is right

## The Challenges:

- Will 3D imagery form part of Council records?
- Will 3D imagery of internal structures be deliverable in a LIM?

# The Final Word:

Our CE Blair King was on board with this project before the Business Plan had even made it to “First Draft” ....

His final words:



*“I knew this would fly!”*

*Yep, he's pretty annoying sometimes*

A black quadcopter drone is shown in flight, centered in the frame. It has four arms extending outwards, each with a propeller. A camera is mounted on the front of the drone. The background is a soft, out-of-focus green field. The text "Any Questions?" is overlaid on the left side of the image.

Any Questions?