Ground Control

Consumer Attitudes Towards

Commercial and Military Drone Applications

2024

Introduction

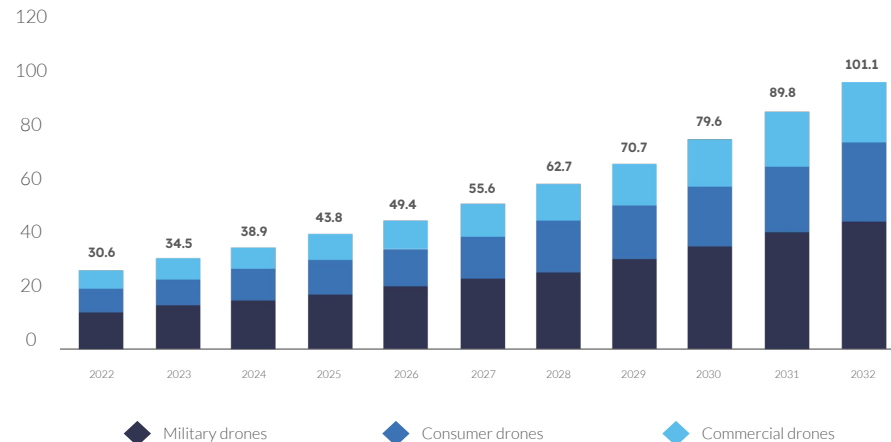**Market.us analysis** from December 2023 indicates that the drone market will surpass **$101.1 Billion by 2032**. That's a projected Compound Annual Growth Rate (CAGR) of 12.7%. While Asia Pacific has the largest revenue share (39.6%), North America has the fastest CAGR throughout the growth period, with Europe close behind.

Military applications still dominate, with a revenue share of 48.6%, but as the chart illustrates, strong growth is anticipated in commercial drone applications, e.g. precision farming, delivery & logistics, infrastructure inspections, search and rescue, and surveillance.

Global Drone Market

Size, by Type, 2022-2032 (USD Billion)

Year	Value
2022	30.6
2023	34.5
2024	38.9
2025	43.8
2026	49.4
2027	55.6
2028	62.7
2029	70.7
2030	79.6
2031	89.8
2032	101.1

◆ Military drones   ◆ Consumer drones   ◆ Commercial drones

The market will grow at a CAGR of:

12.7%

The forecasted market size for 2032 (in USD):

$101.1B

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Drones look set to become part of the landscape;
but how does the average person feel about this?

We surveyed over 500 adults in the United States

to get their take on the use of drones across different
military and commercial applications.

- Are citizens broadly in favor of drones?
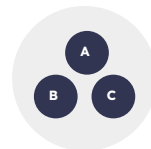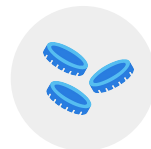- What are the perceived benefits?
- What are the barriers to increased drone usage?
- Will drones put people's jobs at risk?
- How do consumer perceptions stack up against the evidence base?

We'll see how diverse **age groups, income brackets** and **industries** respond,
with some marked differences in opinion.

If you're a drone manufacturer or considering using drones in a commercial application, this ebook will provide you with insight that you can use to shape your communications strategy.

What were we trying to find out?

We were particularly curious to learn whether:

- Drone technology appeals more to younger or older age groups
- Income or industry has a bearing on attitudes towards drones
- There are specific drone applications that people are more comfortable with
- Respondents are concerned about specific elements of drone technology
- The perceived benefits to outweighed respondents' reservations
- There's more work for the drone industry to do to improve perceptions

Data Highlights
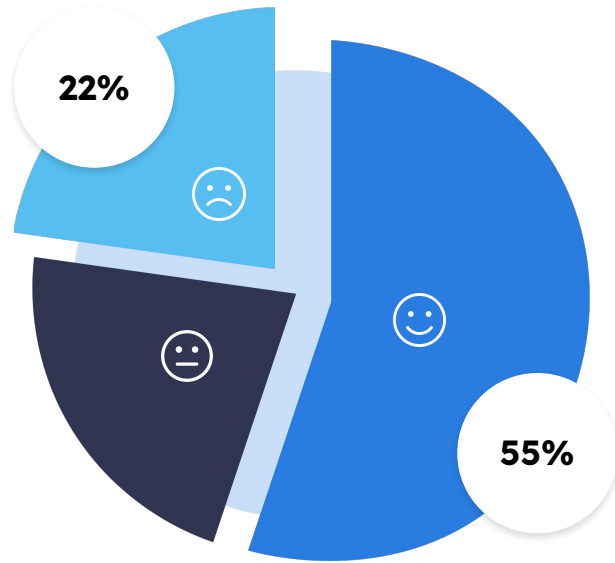
55% of respondents expressed support ("comfortable" or "very comfortable") for commercial drone applications vs **22% not in favor** ("uneasy" or "very uneasy")
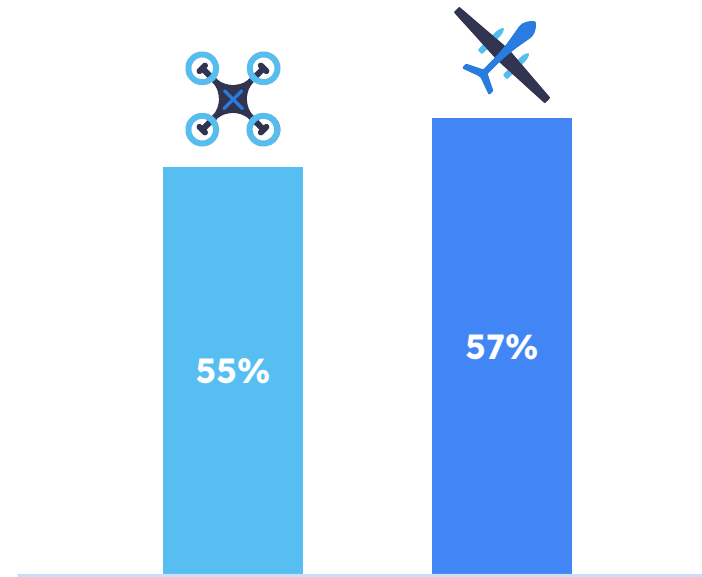
There was fractionally more support for military drone applications than commercial ones **(57% vs 54%)**

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54% of respondents have concerns about privacy: *limitations over what information a drone can capture, store and process*

45%

46%

27%

54%

65%

17%
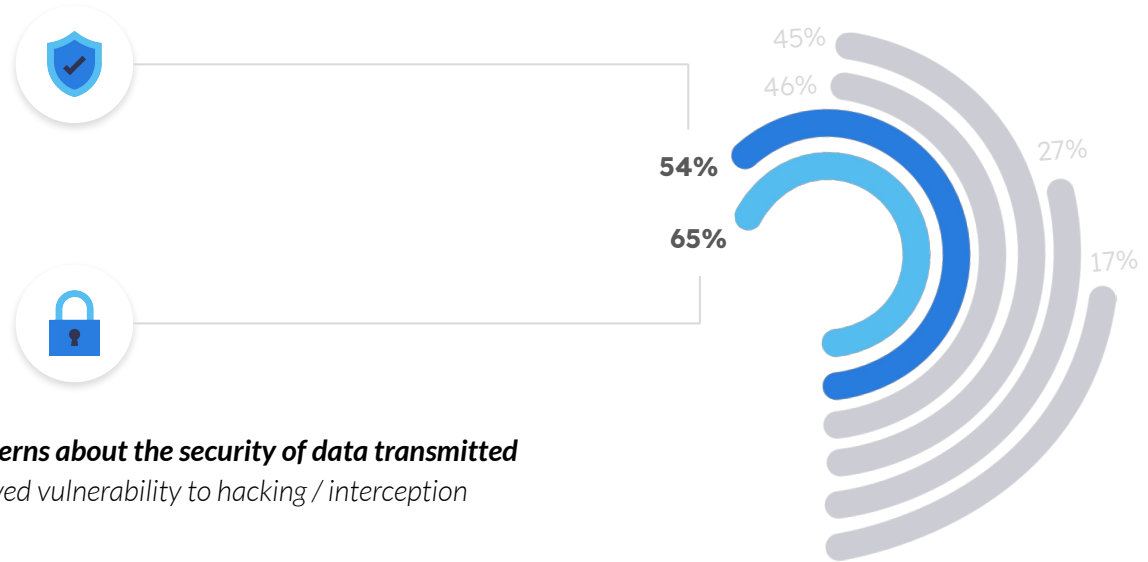
65% of respondents have concerns about the security of data transmitted *via drones, and their perceived vulnerability to hacking / interception*

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Fewer than a third of respondents felt that drones used for commercial applications **were safer or better for the environment** than the processes they might replace

Safer

Better for the environment

30%

32%

OVERALL IN FAVOUR

100%

75%

50%

25%

0%

All respondents | Healthcare | Technology | Male | Female | 18-29 Yr olds | 30-44 Yr olds | Income <$10k | Income >$100k
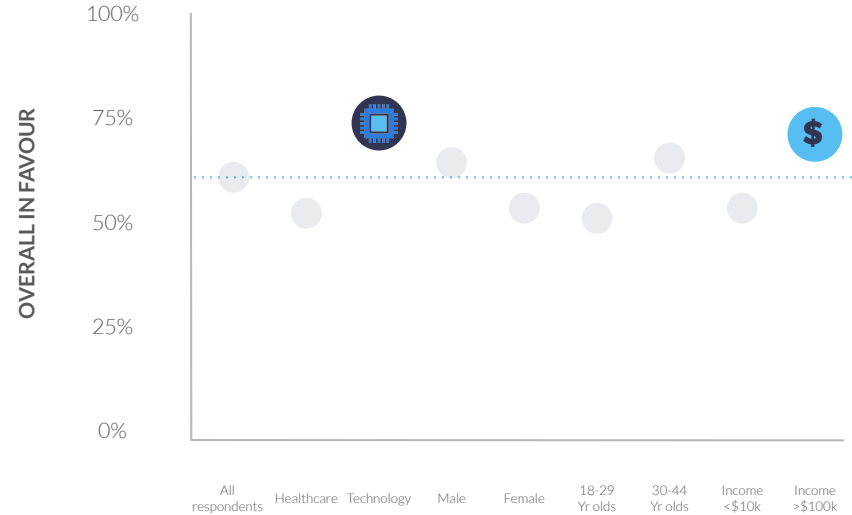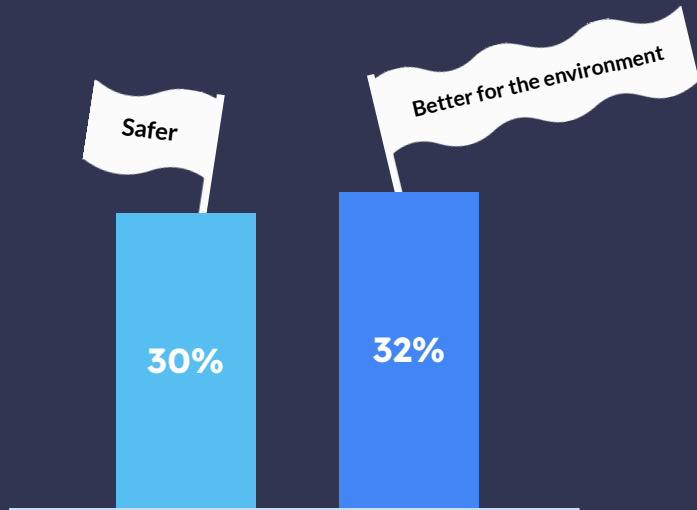
People working in **Technology or with household incomes over $100,000 p/a** were more in favor of wider drone adoption than average **(74% and 68% vs. 58%).**

Where **household incomes exceeded $100,000 p/a,** there was more support for drone applications both **commercial (67%) and military (71%)**

Where **household incomes were lower than $10,000 p/a**, there was less support for commercial drone applications **(40% vs 55% average) and military (44% vs. 57%)**
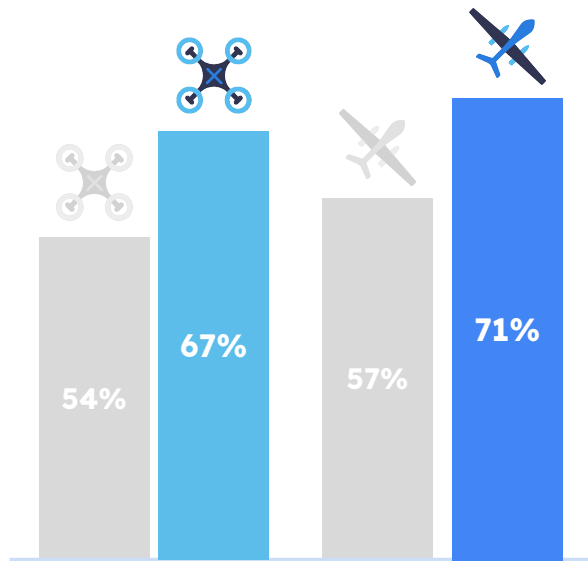
Exceeded $100k p/a

Under $10k p/a

54%   67%   57%   71%

55%   40%   57%   44%

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0%   50%   100%
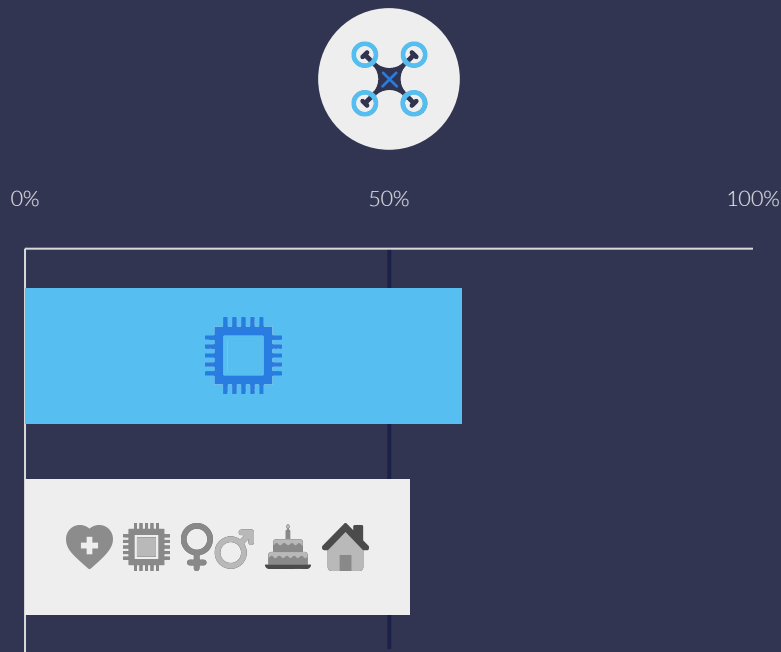
People who **worked in technology** were more likely to state that they were **comfortable with all types of drone applications** than average **(67% vs. 55%)**

Healthcare Respondents

22%

All Respondents

40%
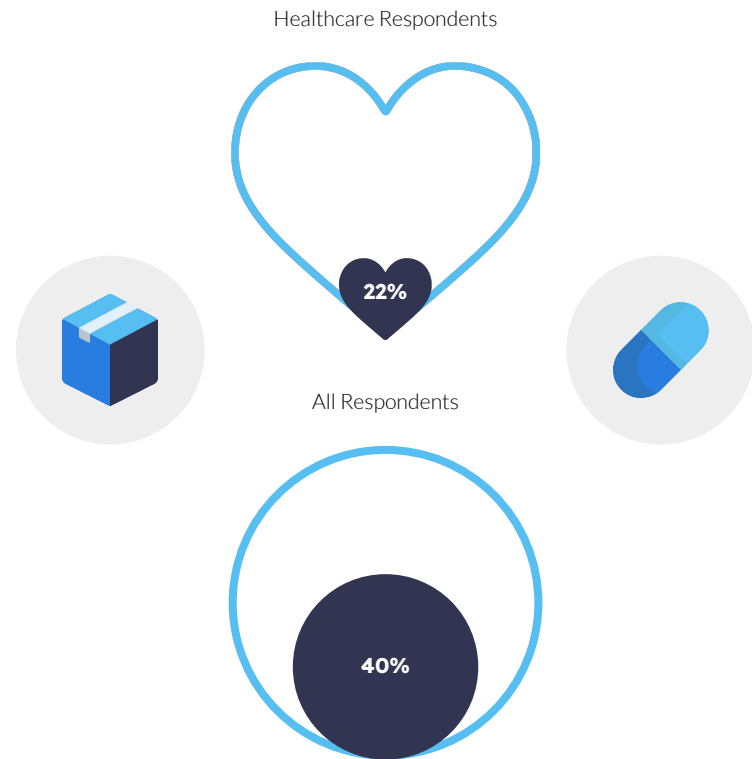
People who **worked in healthcare** were **less likely to express support** for parcel deliveries and prescription medicine deliveries than average **(22% vs. 40%)**

All respondents   **Under 30s male and female**

54%

35%

← Support →

100%   100%

All respondents   **Over 60s male and female**

36%   45%

← Disapproval →

100%   100%

40%   27%

← Support →

100%   100%
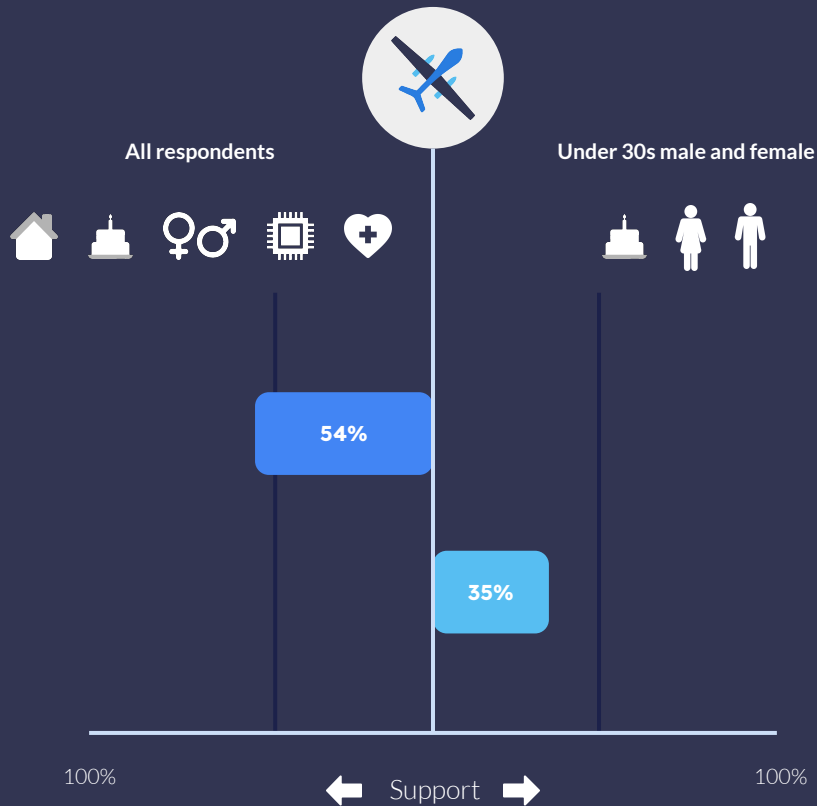
Under 30s were less likely to support active military applications for drones than average *(35% vs. 54%)*
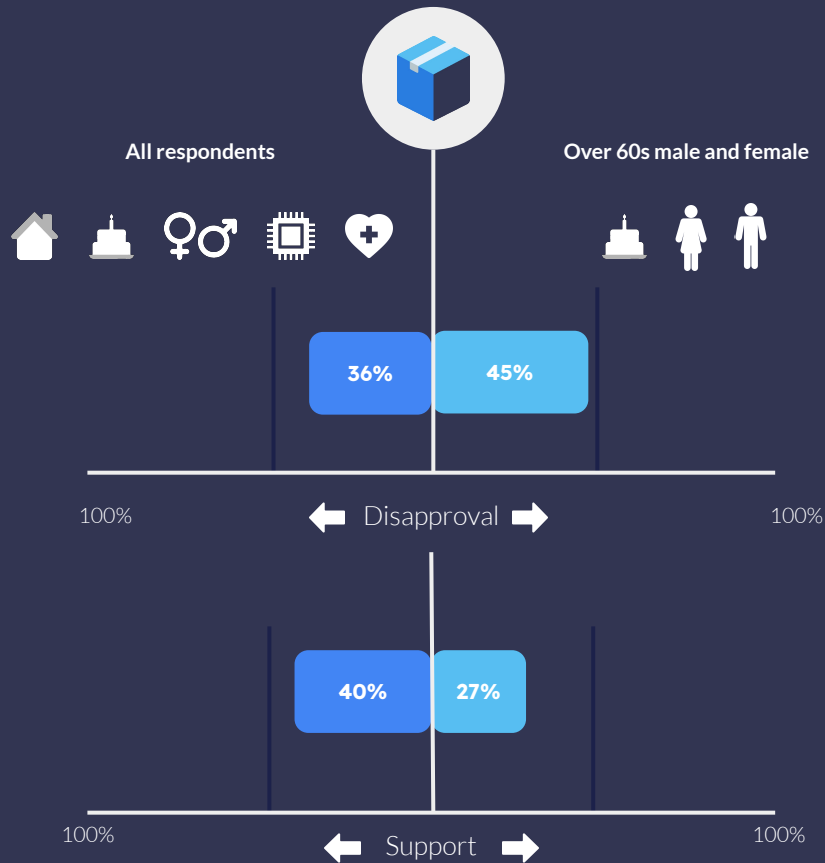
Over 60s were less likely to welcome parcel or medicine deliveries via drone *(45% "uneasy" or "very uneasy"; 27% "comfortable" or "very comfortable" vs 36% and 40% respectively).*

Key Findings

In general, **most people are supportive of commercial and military drone applications.** Digging into the details, some applications are clearly more desirable than others.

Commercial Application	Comfortable or Very Comfortable	Uneasy or Very Uneasy
Emergencies	72%	12%
Environmental Monitoring	64%	13%
Remote Safety Inspections	58%	16%
Parcel Deliveries	43%	27%
Prescription Medicine Deliveries	37%	44%

Within commercial applications, the use of drones for emergencies (e.g. search and rescue and disaster response) is broadly welcomed, in contrast to prescription medicine deliveries.

Negativity Towards Prescription Medicine Deliveries

People working in healthcare were the least likely to support prescription medicine deliveries via drone. **58% were uneasy or very uneasy, with only 18% in favor.** The same group were also more likely than average to perceive wider drone adoption as leading to job losses **(38% vs. 27% average),** and there may be some correlation there.

People in their over-60s were also more likely to describe themselves as uneasy with prescription medicine deliveries (51% against vs. 26% in favor). They were the group least likely to see 'faster deliveries' as a benefit of commercial drone applications **(38% vs. 49% average)**, so potentially have concerns about the speed and reliability of deliveries.

The groups that bucked the trend were people working in technology **(20% against, 54% in favor)** and people with household incomes over **$100,000 (35% against, 47% in favor).**

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Military Applications

Military Application	Uneasy or Very Uneasy	Comfortable or Very Comfortable
"Passive" military applications (surveying, monitoring)	19%	59%
"Active" military applications (identifying / destroying targets)	25%	54%

Perhaps because they have been in use for a longer period, giving people time to adjust to the concept, there's more support for military drone applications than commercial applications. This is most pronounced in **where household incomes are over $100,000 where 72% support passive applications, and 69% support active applications.**

People working in **technology** are also more likely to support military drone use **(67% and 60%, respectively)**, and fewer are actively against the idea **(11% and 13% are uneasy, or very uneasy, about passive and military applications).**

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The group least in support of military drone use is the under 30s, particularly active applications.

Only 35% of under 30s supported the use of drones for identifying and destroying targets, and 36% were uneasy or very uneasy about this application.

People living in lower income households (<$10,000) were also less likely to support the use of drones in active military applications, with 35% not in favor, vs. 38% in favor.

People working in Education & Research, or Healthcare, were also less likely to support active military drone use: 43% and 42% in support, respectively, and 37% and 34% opposed

Overall survey averages were 25% not in favor and 54% in favor

Perceived Benefits of Wider Adoption of Commercial Drone Applications

Respondents were invited to select as many options as they agreed with, so it's interesting that no single benefit was singled out by more than half of the respondents.

Benefit	% of Respondents
Safer	30%
Better for Environment	32%
Faster Deliveries	49%
Faster Data Collection	37%
Lower Cost	38%
Reduced Human Error	27%

To place this in the context of other data points, a **2021 study found that 68% of British citizens believed drones would positively impact their lives.** And a 2021 study in the EU found that **83% of respondents** were positive about the use of drones in cities.

Significant deviations from the average came from Healthcare professionals, who were less likely to say that commercial drone applications are safer **(19%),** compared with people with **household incomes of less than $10,000,** who were *more* likely to view drone deliveries as safer **(44%).** The over 60s had less faith in there being faster deliveries **(38%).**

Drone Benefits: The Data

Emissions from drones for 'last-mile' deliveries are **84% lower** **than diesel trucks**

In the context of remote safety inspections, **drones are a tenth of the cost** of the alternative manned helicopter option

Drone-based applications will reduce global greenhouse gas emissions by **0.9 - 2.4 gigatons by 2030**

Because drones can hover and fly at slower speeds, **they are safer than manned helicopters**

AI-enabled agricultural drones could **reduce herbicide use by 90%**

Because drones can get closer to assets than a helicopter, **they can capture "far superior" data,** delivering more comprehensive inspections

Fully autonomous drones could **cut delivery times in half**

In an emergency situation, drones are often the **only realistic means** of collecting aerial imagery in many countries.

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Case Study:
Asset Inspection

Drones are a common tool used at **Sellafield Nuclear Power Station** in the UK for various tasks, from managing the site to tackling tough environments with high radiation levels, all aimed at minimizing risks.

Recently, they were deployed to inspect a discharge line in a lagoon, **spanning 328 feet and situated 26 feet above ground level.** In the past, such inspections would have demanded elaborate scaffolding setups and **taken up to 16 weeks to complete.**

However, thanks to the drone survey, which was efficiently planned, executed, and processed by **just two individuals within three days**, significant time and resources were saved, **estimated at around $130,000. (Source)**

💡 Less manpower and physical setups required

💡 Huge savings on time and resources

Perceived Barriers to Wider Adoption of Commercial Drone Applications

When asked what they felt **might prevent commercial drones from being used more widely,** respondents had the greatest **concerns over security and privacy.**

Commercial Application	% of Respondents
Security (Vulnerability to Hacking / Interception)	65%
Privacy (What Data Can be Captured & Stored)	54%
Potential for Collisions	46%
Reliable Communications	45%
Potential for Job Losses	27%
Adequate Power Supply	17%

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Concerns over security were particularly acute for the Technology industry, with 76% of respondents highlighting this.

Education & Research employees were the most likely to **cite privacy concerns (62%),** followed by **Healthcare professionals (60%).**

Healthcare professionals, as mentioned earlier, are the **most likely group to cite job losses as a concern (38%),** followed by households with an income of **less than $10,000 (35%).**

Education & Research is also the group most likely to **flag reliable communication with the drone as a barrier, at 52%.**

Interestingly, **very few respondents thought that power supply might present a challenge,** whereas analysts at McKinsey & Company **cite this** as a key limitation for commercial drone applications.

Which provides a neat segue into...

Experts' View on Barriers to Wider Adoption:
1. Communication & Collision Avoidance

"It's a very bureaucratic process, getting permission to fly. That's one of the biggest challenges we're having - to secure a drone and use it here." - **Joel Kitutu, Uganda Red Cross Society (source).**

Every country has different regulations for drone use, and the FAA's are particularly strict:

- ◇ Air carriers who cross state or national borders cannot operate UAVs (this includes UPS, DHL, USPS etc.)
- ◇ Drones must be within line of sight of the pilot of command (with a 14" drone, this is limited to approximately **0.45 square miles)**
- ◇ Fully autonomous drones are prohibited (consider the challenge of navigating obstacles in built-up areas without computer guidance)
- ◇ Remote pilots can only operate one drone at a time
- ◇ Drones cannot be operated from a moving vehicle (such as a delivery van).

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They're in place because there are concerns about reliable communication **'Beyond Visual Line of Sight' (BVLOS)**, and collision avoidance; perfectly legitimate reasons, but it's not hard to see how this complex regulatory environment has slowed down commercial drone use.

In 2023, Amazon claimed to have created a new "sense-and-avoid" system which will "allow our drone to operate at greater distances while safely avoiding other aircraft, people, pets, and obstacles."

But what options exist for less-well funded organizations? Operators can request a waiver, but it's a manual exercise with many grey areas, lacking a standardized process. **In a 2023 white paper, satellite network operator Iridium argued that the "manual waiver and exemption process presently utilized to ensure safe operations has proven to be unscalable."**

iridium®

Iridium's white paper sought to prove that BVLOS navigation and collision avoidance was possible and practical with existing technology, as long as two forms of communication with the drone were available throughout all phases of the flight.

The list includes:

- ❖ **4G / LTE / 5G**
- ❖ **L-Band (Satellite Connectivity)**
- ❖ **900 MHz**
- ❖ **C-Band (Satellite Connectivity)**
- ❖ **VHF**

They propose a 'Minimum Equipment List', which, if adhered to, would accelerate the waiver process and jumpstart the use of drones in commercial applications.

While this hasn't been adopted yet, it's a practical, evidence-based solution that holds merit.

Read Iridium's Whitepaper:
https://www.iridium.com/monitored-bvlos-safe-separation-whitepaper/

Prescription Delivery, Piloting BVLOS

To deliver vital chemotherapy drugs to patients on an island off the south coast of England, **Skylift UAV** built an autonomous eVTOL (electric, vertical take-off and landing) aircraft which can fly for 1.5 hours on a single charge, with a maximum speed of 100 Mph. In BVLOS configuration, **it can travel up to 62 miles (100 KM), depending on the payload.**

The drones are autonomous, but monitored by Skylift's safety pilots who can take control of the drone at any time. As the drone travels BVLOS, and across a body of water, it's essential that the pilots have two reliable means of communication with the drone at all times. **The Skylift UAV team chose the RockBLOCK 9603 to deliver satellite connectivity in addition to aviation-grade L-Band radio to ensure that irrespective of the drone's location, connectivity is guaranteed.**

RockBLOCK allows them to send and receive data from the aircraft, and is part of the robust communications package with which all Skylift drones are equipped. It's also the final line of defense for mission success.

Experts' View on Barriers to Wider Adoption:
2. Security & Privacy

American citizens are, arguably, already well protected from a privacy standpoint. The firm Rupprecht Law, who specialize in drone law, **lists five reasons** why it's a legitimate issue, but not a barrier. These include legal protections, the use of intermediary points or docking stations, and the relative protection afforded if the drones are traveling over 400 ft up.

Security - protecting drones from being hacked - is likely to be the issue that persists long after everything else has been resolved. **Like any computerized system, the manufacturers have a responsibility to monitor for, and, resolve vulnerabilities.**

Pilots and operators need to follow the same guidance offered for IT security in general:

- ◇ Ensure that you regularly install updates
- ◇ Install security software; use a VPN and encrypted protocols
- ◇ Backup your data

Plus, uniquely, implement a **'Return Home'** feature.

"If all else fails and you lose connection with your drone, make a protocol for it to return to a secure location. This is an essential practice."
Security in Drones - Angelo State University

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Experts' View on Barriers to Wider Adoption:
3. Job Losses / Job Creation

According to one study, drones **"could displace $127 billion in labor and services across multiple industries"** **(source)** as pilots, laborers and farmers are replaced by autonomous drones. It is perhaps surprising that relatively few **(27%)** of our survey respondents cited this as a problem.

On the other hand, advocates of drone technology say that the **integration of UAVs could create more than 100,000 jobs in the United States**, mostly within manufacturing and drone operation **(source)**. It may be a question of retraining and redeployment of workforces, as has happened in other disrupted industries before.

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Experts' View on Barriers to Wider Adoption:
4. Power Supply

Although when asked to think about commercial applications of drones, **people tend to focus on parcel deliveries,** it's possible that the fastest uptake of drones will be in **Agriculture, Utilities, Oil and Gas and Environmental Monitoring.**

In Agriculture, drones can assist with crop health monitoring, for example. **In Utilities and Oil and Gas, the potential for faster, safer and more accurate remote infrastructure inspections seems likely to drive growth.** And, as we manage the effects of global warming, using drones to monitor bodies of water, forests, areas of seismic activity and the ice caps will help us understand and mitigate risks faster.

Consumer Attitudes Towards Commercial and Military Drone Applications   **Ground Control Technologies 2024**

The shared characteristic of all of these applications is that they cover large areas of land, and so both the ability to pilot the drone **BVLOS**, and having a robust power supply, are key elements.

Larger drones may be engine-powered, with an electrical generator powered by the engine. **Smaller drones are likely to be battery powered.** Power management systems can extend battery life, of which there's a good explanation **here**. This is an area where continued innovation will be required to unlock some applications.

"By 2030, we expect BVLOS drone solutions will be ubiquitous for asset inspection, including energy infrastructure, road and rail, and to predominate in routine building and infrastructure inspections, with data automatically updating digital software analysis." **Department for Business, Energy & Industrial Strategy, HM Government**

Case Study:
Infrastructure Inspection
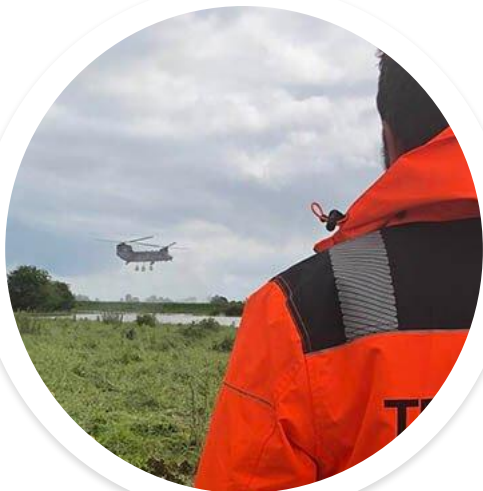
A groundbreaking application of drones involves detecting underground leaks, a **critical issue in the UK where approximately 792 million gallons of water are lost daily.** Using thermal and multispectral imagery, drones can identify and precisely locate leaks from above. This data helps ground crews investigate further by analyzing temperature fluctuations or spectral signatures.

TeamUAV leads the way in this innovation. **According to them, their drone-based leak detection method boasts a 75% accuracy rate and boosts efficiency tenfold.** As the industry expands and regulations for Beyond Visual Line of Sight (BVLOS) operations evolve, this efficiency is expected to increase even more. Additionally, **TeamUAV** has utilized drones to map and generate 3D models of pump station networks for major water companies in the UK.

Closing Remarks

While regulation remains a significant barrier for wider adoption of commercial drone applications, it will be overcome: market forces demand it. **Solutions for the challenges of communication and collision avoidance already exist, and the industry received [$4.8 billion in investment in 2022 alone.](#)** And at least from the operators' perspective, the benefits, both projected and empirically demonstrated, outweigh the drawbacks.

But our respondents were, for the most part, cautious in their responses, particularly the over 60s, people in lower income households, and people working in Healthcare and Education and Research. Companies planning to deploy drones should consider how they communicate the benefits and address the concerns of citizens.

This is particularly true for delivery use cases, which may impact the daily lives of our respondents.

Consumer Attitudes Towards Commercial and Military Drone Applications 2024

Methodology

In March 2024, we surveyed **521 (>18 years old) adults** in the **USA**, capturing data on the industry in which they worked, their **age, gender,** and **household income**. We asked four questions:

Question 1
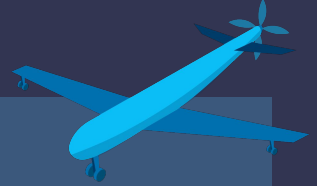
#1 Please rate on a scale of 1 (very uneasy) to 5 (very comfortable) how you feel about drones being used for the following applications:

Parcel deliveries

Remote safety inspections (e.g. wind farms, dams, pipelines)

Emergencies (e.g. search & rescue, surveying damage)
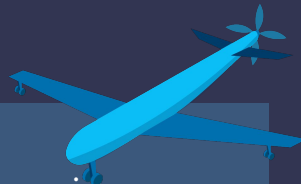
Prescription medicine deliveries

Environmental monitoring
(e.g. air, water & soil quality, biodiversity)

"Passive" military applications (surveying, monitoring)

"Active" military applications
(identifying / destroying targets)
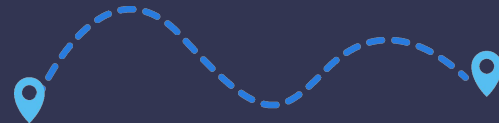
Question 2

#2 What do you think are the greatest concerns / barriers preventing wider adoption of drones for commercial (non-military) applications?

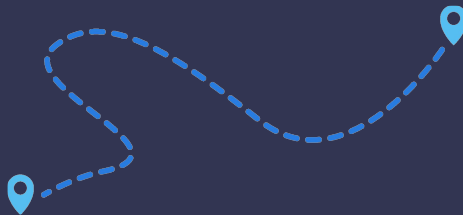Reliable communication with the drone wherever it goes

Potential for collisions with other airspace users
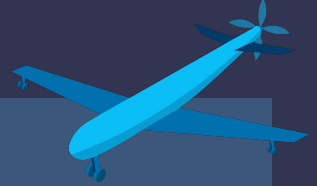
Security - ease of hacking / interception

Privacy - what information the drones can capture and store

Potential for job losses

Adequate power supply

Question 3

#3   What do you think will be the main benefit(s) of using drones for commercial applications? Please select all that apply.
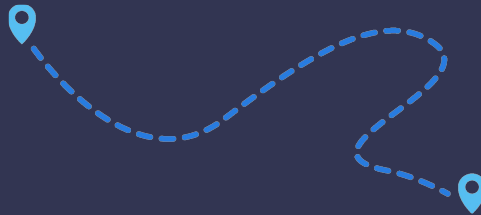
Safer

Better for the environment

Faster deliveries

Faster data collection, leading to faster insights

Lower cost

Reduced potential for human error

Question 4

#4 On a scale of 1-100, please indicate to what degree you're in favor of drones being more widely adopted in commercial applications (1 being not at all in favor; 100 being completely supportive).

0   100