

**2023 Economic Impact of DJI**  
**Methodology and Documentation**

**Prepared for**

**DJI Technology**  
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## The DJI Economic Impact Study: 2023

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The drone industry is a rapidly growing segment of the United States economy. Once used exclusively by the military, these unmanned aircraft are gaining popularity among consumers, prosumers, and a wide range of commercial businesses.

From filming movies to creating real estate videos, from livestock management to crop spraying, and from search and rescue missions to disaster relief, DJI's products are driving \$116.9 billion in economic activity across the nation.

DJI's overall economic impact supports a total of 464,643 American jobs, generating \$39.2 billion in wages and benefits, as well as \$12.1 billion in federal, state, and local taxes.<sup>1</sup>

DJI commissioned John Dunham & Associates (JDA) to quantify the economic contributions that the company makes to the United States at the national, state, and Congressional district levels. The analysis examines DJI's operations, sales and distribution network, US purchases for its global operations, and the impact of the use of its products by commercial enterprises in the United States. The project examined the economic impact for calendar year 2023.

DJI is a job creator across a wide range of industries that are increasingly dependent upon drone usage. These include agriculture, construction, oil and gas, real estate, filmmaking, surveying, transportation, manufacturing, retailing, hospitals, law enforcement and emergency services. In a recent survey of commercial drone users, 66.5 percent said they would be out of business if not for drones manufactured primarily by DJI.<sup>2</sup>

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### Key Takeaways from the Study

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- DJI's economic impact in the United States totals over \$116 billion.
- The activities and use of DJI products generates over 464,000 U.S. jobs and \$39 billion in wages.
- The top five states where DJI has the greatest economic impact are:
  - California (\$14.5 billion)
  - Texas (\$11.1 billion)
  - Florida (\$10.3 billion)
  - New York (\$4.4 billion)
  - Washington (\$3.4 billion)
- DJI and those businesses that use DJI products contribute over \$12 billion in taxes to support federal, state, and local economies. This includes taxes paid by the company and its employees, as well as those paid by suppliers, retailers, drone users, and their employees, and taxes paid by employees whose jobs are indirectly created by the company, its users, and its activities.
- 66.5 percent of commercial drone users report they would be out of business if not for drones manufactured primarily by DJI.
- An estimated 74 percent of drones used in America are produced by DJI.<sup>3</sup>
- Commercial drones are used for a range of applications, among which photography ranks the highest, followed by mapping, infrastructure inspection, and surveying.
- According to the Federal Aviation Administration, there are more than 316,700 registered commercial drone pilots in the United States as of March 2023.

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<sup>1</sup> Including all activities directly and indirectly supported by DJI.

<sup>2</sup> Based on data from a survey of commercial drone users conducted by the Drone Service Provider Alliance (DSPA) and other industry stakeholders (see question 9 of the survey in Appendix A). This question addresses DJI drones and a limited number of drones produced by other companies based in China, including Yuneec and Autel.

<sup>3</sup> Ibid.

## Summary Results

The DJI Economic Impact Study measures the impact of the production, sales, and use of DJI drones and other DJI products in the United States for 2023.<sup>4</sup> For the purpose of this analysis, the industry is defined to include all DJI operations in the United States, the sales and distribution of DJI products within the United States, the purchasing of US-based products and services used in international production, and the commercial use of DJI products within the United States.

Combined, the production, distribution and sales, and use of DJI products, and the supplier and induced spending linkages, support about 464,643 jobs in the United States. The company's footprint is roughly \$116.87 billion in total economic output. Through its production, distribution, retail, and usage linkages, DJI impacts firms throughout the US economy. DJI production operations include those workers directly employed by DJI in the United States, including everything from warehouse workers to salespeople to research and development staff. DJI sales and distribution linkages include firms that wholesale and/or retail DJI products.

DJI global purchase impacts reflect the jobs created at US-based suppliers of parts, intellectual property and services that are sourced from the United States for the company's international operations; this does not include suppliers to domestic operations (which is included as part of the supplier impact). Finally, *DJI Use* impact measures the economic footprint of those businesses dependent on DJI products as a part of their own operations.

Additional firms are related to the various DJI direct industries as suppliers. These firms produce and sell a broad range of items, including packaging materials, safety equipment, and fuel. In addition, supplier firms provide a broad range of services, including personnel services, financial services, advertising services, consulting services and even transportation services. Finally, a number of people are employed in government enterprises responsible for the regulation of drone-related industries. All told, JDA estimates that DJI is responsible for 135,820 supplier jobs, with these firms generating nearly \$35.74 billion in economic activity.

An economic analysis of the industry will also take additional linkages into account. While it is inappropriate to claim that suppliers to the supplier firms are part of the industry being analyzed,<sup>5</sup> the spending by employees of the industry and those of supplier firms whose jobs are directly dependent on DJI-related sales and production should be included. This spending on everything from housing, to food, to educational services and medical care comprises what is traditionally called the "induced impact" or the multiplier effect of the industry. In other words, this spending, and the jobs it creates, is induced by the production, distribution, sale, and use of DJI products. JDA estimates that the induced impact of the industry is about \$37.94 billion, and generates 186,335 jobs, for a multiplier of about 0.88.<sup>6</sup>

An important part of an impact analysis is the calculation of the contribution of the industry to the public finances of the community. In the case of DJI, this contribution comes in two forms. Direct taxes, which are paid by the firms and their employees, provide nearly \$12.1 billion in revenues to the federal, state, and local governments. Consumption taxes, such as state and local sales taxes, are also often applied to drone-related products, though the impacts of such taxes are not estimated here.

Table 1 below presents a summary of the total economic impact of DJI in the United States in 2023.

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<sup>4</sup> Economic impact analysis reflects a point in time, not a flow. Therefore, the measurement of the impact of DJI is as of spring 2023.

<sup>5</sup> These firms would more appropriately be considered as part of the supplier firms' industries.

<sup>6</sup> Often economic impact studies present results with very large multipliers – as high as 4 or 5. These studies invariably include the firms supplying the supplier industries as part of the induced impact. John Dunham & Associates believes that this is not an appropriate definition of the induced impact and as such limits this calculation to only the effect of spending by direct and supplier employees.

**Table 1**  
**Full Economic Impact of DJI: 2023**

	<b>Direct</b>	<b>Supplier</b>	<b>Induced</b>	<b>Total</b>
Output	\$43,188,003,600	\$35,737,477,200	\$37,943,482,200	\$116,868,963,000
Jobs	142,488	135,820	186,335	464,643
Wages	\$15,770,397,400	\$11,166,842,800	\$12,231,299,400	\$39,168,539,600
Business Taxes				\$12,065,005,600

### Detailed Results

The benefits of DJI to the economy of the United States are numerous and much more than the employee base that the company maintains at its 6 facilities located across the country. Like most international companies with sales in the US, DJI purchases goods and services from a wide range of suppliers, and maintains sales, distribution, and service networks across the country.

In addition to these impacts, the model examines how DJI drones and other products help American businesses directly create an additional 140,143 jobs throughout the country. These jobs, which are nearly 60 times the jobs directly supported by DJI's own operations, are just as important, as they represent a wide range of Americans, including photographers, realtors, farmers, and even first responders, who use the technologies that DJI provides in their work.

### DJI Operations

DJI operates a total of 6 facilities in the US, most of which are located in California, but which have impacts all across America. These facilities include operations involved in research and development, product support and sales. In total, the company employs 119 full-time-equivalent (FTE) employees at its facilities and offices. **This is more employees than 98.1 percent of all US firms.**<sup>7</sup> Once the supplier and induced impacts are accounted for, nearly 482 total FTE jobs are created, generating a total of \$46.3 million in wages and benefits for American workers. The overall economic activity generated by DJI's employees in America is nearly \$166.4 million.

**Table 2**  
**Economic Impact of DJI's Employees in the United States**

	<b>Direct</b>	<b>Supplier</b>	<b>Induced</b>	<b>Total</b>
Output	\$71,969,300	\$49,501,900	\$44,890,900	\$166,362,100
Jobs	119	143	220	482
Wages	\$16,997,400	\$14,816,100	\$14,461,200	\$46,274,700
Business Taxes				\$15,237,300

Note: May not add to total of breakout tables below due to rounding.

### DJI Purchases of Goods and Services

While the bulk of DJI's manufacturing operations are located abroad, the company depends on a wide range of goods and services provided by companies located throughout the world. This includes about \$47.2 million in purchases from American firms, ranging from logistics and legal services to materials purchases.

<sup>7</sup> *Statistics of U.S. Businesses*, US Department of Commerce, Bureau of the Census, at: [www.census.gov/programs-surveys/subs.html](http://www.census.gov/programs-surveys/subs.html). Data for 2020.

These purchases fund additional good jobs, paying families wages and benefits throughout the country. About 213 FTE jobs directly rely on purchases of products from American firms for the company's international operations. These jobs, in turn, create additional jobs at their suppliers, and induce further economic activity through the re-spending of worker wages in the economy. All told, DJI's purchases from American firms and used in the company's international operations create 516 FTE jobs in the United States, paying \$40,489,400 in wages and benefits, and generating \$109,033,500 in total economic activity.

**Table 3**  
**Economic Impact of DJI's Purchases in the United States Destined for International Markets**

	<b>Direct</b>	<b>Supplier</b>	<b>Induced</b>	<b>Total</b>
Output	\$46,977,600	\$22,764,600	\$39,291,300	\$109,033,500
Jobs	213	110	193	516
Wages	\$19,419,100	\$8,406,500	\$12,663,800	\$40,489,400
Business Taxes				\$12,990,700

#### Distribution and Sale of DJI Products

DJI generally relies on an extensive distribution and retailing system created by a range of international and US-based firms to sell its products.<sup>8</sup>

These retailers are located throughout the country, in large cities, and in smaller towns. They include large national chains, as well as thousands of local and regional mom-and-pop photography and electronics stores, employing local workers.<sup>9</sup> It is estimated that the sale of DJI products results in a total of 4,159 FTE jobs created in the United States, with those workers receiving \$271.5 million in wages and benefits. All told, the retailing and distribution of DJI's services, drones, and other ancillary products generates \$714.2 million in economic activity in the US economy. (Table 4 below)

**Table 4**  
**Economic Impact of DJI's Sales and Distribution Network in the United States**

	<b>Direct</b>	<b>Supplier</b>	<b>Induced</b>	<b>Total</b>
Output	\$264,256,500	\$186,641,300	\$263,346,900	\$714,244,700
Jobs	2,012	854	1,293	4,159
Wages	\$122,552,600	\$64,115,800	\$84,860,400	\$271,528,800
Business Taxes				\$104,149,700

#### Commercial Use of DJI Products

DJI is a job creator among a wide range of industries that are increasingly dependent upon drone usage. These industries include agriculture, construction, oil and gas, real estate, filmmaking, surveying, transportation, manufacturing, retailing, law enforcement and emergency services. In a recent survey of

<sup>8</sup> These include household names like Amazon and Costco, as well as major photography and electronics distributors and retailers such as B&H Foto & Electronics Corp. and Adorama Camera, Inc. In addition, thousands of other small and regional retailers market DJI's products to companies throughout the US. In fact, DJI Technology accounts for roughly 74 percent of all commercial drones sold in the US market, according to the results of a survey of commercial drone users conducted for this study.

<sup>9</sup> *Use Tables/After Redefinitions/Margin Details: 2007, 2012*, US Department of Commerce, Bureau of Economic Analysis, [www.bea.gov/industry/industry-underlying-estimates](http://www.bea.gov/industry/industry-underlying-estimates).

commercial drone users, 66.5 percent said they would be out of business if not for companies like DJI and its products.<sup>10</sup>

While more details from the survey are provided in Appendix A, some of the key findings used in the analysis suggested that the majority of commercial drone users were in the photography business. This includes firms involved in commercial photography, surveying and mapping, motion picture and video production, and building inspections.

For all firms responding to the survey, the average number of drones operated was 8.8; however, some firms with a substantial number of drones skewed this number, with the median being 3.

While technically, the economic impact of drone-based photography, surveying, or any other function is a part of the industry utilizing the drone, as the manufacturer of the vast majority of drones used in the United States, DJI felt that it was important to measure the economic impact of drone usage separately from the overall operations of the industries employing 316,715 drone pilots.<sup>11</sup> The results are staggering. It was found that nearly 140,150 FTE jobs in America were directly connected to the use of DJI drones and products.

All told, the operation of these drones supported a total of over 459,500 jobs throughout the United States. These jobs paid over \$38.8 billion in wages and benefits and generated \$115.9 billion in economic activity. This is equivalent to 0.4 percent of all economic activity generated in the United States in 2022. **This means that the commercial operation of DJI drones by American firms generated almost twice the economic activity than that of the nation’s apparel industry.**<sup>12</sup>

**Table 5**  
**Economic Impact of the Use of DJI’s Drones in Commercial Business Activities**

	<b>Direct</b>	<b>Supplier</b>	<b>Induced</b>	<b>Total</b>
Output	\$42,804,800,400	\$35,478,569,300	\$37,595,953,200	\$115,879,322,900
Jobs	140,143	134,739	184,641	459,523
Wages	\$15,611,428,200	\$11,079,504,400	\$12,119,313,600	\$38,810,246,200
Business Taxes				\$11,932,628,300

DJI drones are an important part of the American economy, and their use directly leads to roughly 140,143 direct FTE jobs in industries as varied as farming, energy production and distribution, film production, and forestry. Table 6 below outlines the key industry sectors supported by DJI drones listed in order by NAICS sector.<sup>13</sup>

<sup>10</sup> Based on data from a survey of commercial drone users conducted by the Drone Service Providers Alliance.

<sup>11</sup> *Regional Active Airmen Totals*, Federal Aviation Administration, <https://registry.faa.gov/activeairmen/>. Data Accessed April 2023. Based on the number of *remote pilots*.

<sup>12</sup> *Gross Output by Industry: 2022*, US Department of Commerce, Bureau of Economic Analysis, at: <https://apps.bea.gov/iTable/?reqid=150&step=2&isuri=1&categories=gdpind#eyJhcHBpZCI6MTUwLCJzdGVwcyI6WzEsMiwzXSwiZGF0YSI6W1siY2F0ZWdvcmlscyIsIkdkcHhJbmQiXSxbllRhYmxlX0xpc3QiLCIxNSJdXX0=>

<sup>13</sup> Based on data from a survey of commercial drone users conducted by the Drone Service Providers Alliance.

**Table 6**  
**Industries Supported by DJI Drones Based on Survey Response**

NAICS Sector	Industry Description	FTE	Share
11	Agriculture	34.5	2.1%
21	Mining, Oil, and Gas	9.0	0.6%
22	Utilities	387.0	23.7%
23	Construction	46.0	2.8%
31-33	Manufacturing	39.0	2.4%
48-49	Transportation and Warehousing	2.0	0.1%
51	Information	57.5	3.5%
52	Finance and Insurance	3.0	0.2%
53	Real Estate	7.5	0.5%
54	Prof., Sci., Technical Services (see note)	684.3	41.9%
55	Management	4.0	0.2%
56	Administrative and Support Services	36.0	2.2%
61	Educational Services	10.5	0.6%
62	Health Care and Social Assistance	3.5	0.2%
71	Arts, Entertainment, and Recreation	11.5	0.7%
72	Accommodation and Food Service	1.5	0.1%
81	Other Services	6.5	0.4%
92	Public Administration	291.0	17.8%

Note: Photography is included in Professional, Scientific and Technical Services

## Conclusion

The drone industry represents an important evolution in the 21<sup>st</sup> century commercial space, and DJI has been an industry leader since the beginning. Lightweight, highly adaptable, and (for many uses) significantly more efficient than manned aircraft, drones help businesses save money, save time, keep people safe and so much more.

As this study documents, the use of drones is a major part of the US economy, employing hundreds of thousands of individuals in a wide range of industries. Thousands more benefit by providing goods and services to drone operators and to DJI, while the federal, state, and local governments benefit from over \$12 billion in tax revenues.

## Methodology

The Economic Impact of DJI starts with an accounting of the direct employment of U.S.-based DJI operations. There are 119 FTE employees at 6 facilities, per information shared by DJI. Distribution and retail impacts are based on DJI sales numbers. Other data come from a variety of government and private sources, as well as from a survey of commercial drone users conducted by the Drone Service Providers Alliance (DSPA).<sup>14</sup>

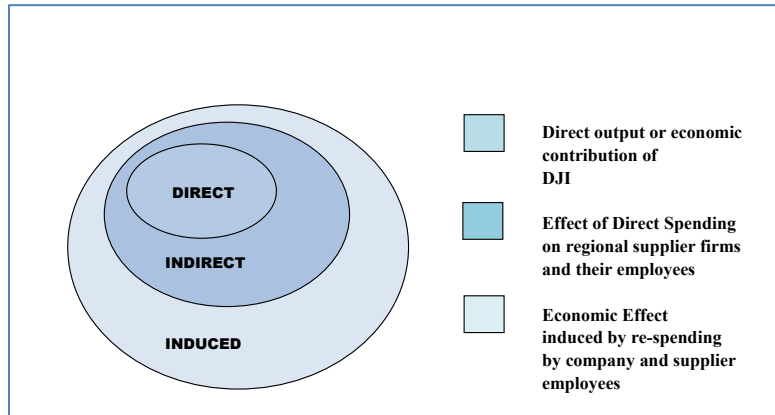
Data from these sources are entered into a detailed input/output model of the US economy developed by IMPLAN, Inc. This model is the source for information on all aspects of the economic impact analysis except for direct jobs.<sup>15</sup>

<sup>14</sup> See Appendix A

<sup>15</sup> IMPLAN® model, 2021 Data, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (2023), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078, [www.IMPLAN.com](http://www.IMPLAN.com)

It is sometimes mistakenly thought that initial spending accounts for all the impact of an economic activity or a product. For example, it may appear that consumer expenditures for a product are the sum total of the impact on the local economy. However, this initial spending on economic activity always leads to a ripple effect that benefits other sectors and industries. This inter-industry effect of an economic activity can be assessed using multipliers from regional input-output modeling.

**Figure 1**  
**Outline of Impact Model**



The economic activities of events are linked to other industries in the state and national economies. The activities required to produce, distribute, and sell a drone, as well as commercial-related drone usage, generate direct effects on the economy. Regional (or indirect) impacts occur when these activities require purchases of goods and services such as building materials from local or regional suppliers. Additional induced impacts occur when workers involved in direct and indirect activities spend their wages in the region. The ratio between total economic and direct impacts is termed the multiplier. The framework in Figure 1 illustrates these linkages.

This method of analysis allows the impact of local production activities to be quantified in terms of final demand, earnings, and employment in the states and the nation.

Once the direct impact of the industry has been calculated, the input-output methodology discussed below is used to calculate the contribution of the supplier sector and of the re-spending in the economy by employees in the industry and its suppliers. This induced impact is the most controversial part of economic impact studies and is often quite inflated. In the case of the DJI model, only the most conservative estimate of the induced impact has been used.

### Model Description and Data

The DJI Economic Impact Model (Model) was developed by John Dunham & Associates based on data provided by DJI, as well as data retrieved through Data Axle,<sup>16</sup> and information from state and federal government agencies. The analysis utilizes the IMPLAN Model in order to quantify the economic impact of DJI products on the economy of the United States. The model adopts an accounting framework through which the relationships between different inputs and outputs across industries and sectors are computed. This model can show the impact of a given economic decision – such as a factory opening or operating a

<sup>16</sup> Job numbers are from Data Axle (formerly Infogroup), the leading provider of business and consumer data for the top search engines and leading in-car navigation systems in North America. Data Axle gathers data from a variety of sources, by sourcing, refining, matching, appending, filtering, and delivering the best quality data. Data Axle verifies its data at the rate of almost 100,000 phone calls per day to ensure absolute accuracy.

sports facility – on a pre-defined, geographic region. It is based on the national income accounts generated by the US Department of Commerce, Bureau of Economic Analysis (BEA).<sup>17</sup>

Specifically:

- ❖ DJI operations employment is based on employment at 6 locations and was provided directly by DJI.
- ❖ Distribution and sales figures by state were also provided by DJI. For this part of the model, sales values were entered into IMPLAN as the input (rather than employment).
- ❖ Data on the purchase of goods and services in the United States for use abroad was provided by DJI by product type although not by supplier or supplier location. JDA broke these data across individual states based on where jobs in corresponding IMPLAN sectors exist in the state. Again, sales data (not employment) were used as the input for this portion of the model.
- ❖ The impact resulting from the use of DJI products by commercial entities in the US starts with the assumption that all commercial drone pilots are registered with the Federal Aviation Administration. According to the FAA, there are 316,715 registered drone pilots in the United States, as of March 2023.<sup>18</sup> These are the only detailed data available and represent commercial drone pilots who have taken the time to actually register. It would not include people operating drones for recreational use, and likely does not include those who might occasionally utilize their recreational drones for limited commercial purposes. As such, the figure may undercount the actual number of people operating drones for commercial purposes; however, it is the only detailed data available.<sup>19</sup> Results from a survey of commercial drone users indicate that (when weighted by employment), roughly 73.7 percent of commercial drones used in the US are DJI products.<sup>20</sup> The *DJI Use* percentage was applied to the number of registered drone pilots to provide an estimate of commercial DJI pilots in the United States.
- ❖ A further break is applied to adjust for average time spent using drones. Based on the survey, a weighted average of responses incorporating both full-time and part-time pilots was 24 hours per workweek. This is an average from the survey, but there is some deviation around this mean. Using a spread of two standard deviations in the data, the lower bound number of hours on average would be 20, and the upper bound would be 28 hours.<sup>21</sup> Finally, if all drone pilots were assumed to work 40 hours weekly on drone-related activities, the impact would be significantly higher (See Table 7).
- ❖ These jobs were then spread across various economic sectors, based on insights from the same survey to capture the broad range of industries dependent on DJI products.

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<sup>17</sup> The IMPLAN model is based on a series of national input-output accounts known as RIMS II. These data are developed and maintained by the U.S. Department of Commerce, Bureau of Economic Analysis as a policy and economic decision analysis tool.

<sup>18</sup> Op. cit., Footnote 10

<sup>19</sup> See for example, French, Sally, *Who Really Buys Drones? Surprising Drone Ownership Data Proves Industry Is Bigger Than We Thought, The Drone Girl*, July 21, 2020, at: [www.thedronegirl.com/2020/07/30/drone-ownership-data/](http://www.thedronegirl.com/2020/07/30/drone-ownership-data/) See Appendix A for more detail.

<sup>21</sup> Since averages can be skewed due to extreme values, the data were examined to determine how many values fell outside of three standard deviations from the mean. There was a single outlier in the data which was removed for the calculations.

**Table 7**  
**Sensitivity Analysis of the Economic Impact of DJI Drones**

Average Hours per Week	Direct Jobs	Direct Wages	Direct Output	Total Jobs	Total Wages	Total Output	Total Business Taxes
20	119,142	\$ 13,168,494,200	\$ 36,053,871,600	388,375	\$ 32,700,198,200	\$ 97,555,774,400	\$ 10,076,236,200
<b>24</b>	<b>142,488</b>	<b>\$ 15,770,397,400</b>	<b>\$ 43,188,003,600</b>	<b>464,643</b>	<b>\$ 39,168,539,600</b>	<b>\$ 116,868,963,000</b>	<b>\$ 12,065,005,600</b>
28	165,851	\$ 18,372,302,500	\$ 50,322,137,300	541,303	\$ 45,636,921,200	\$ 136,182,190,000	\$ 14,053,778,100
40	235,918	\$ 26,178,016,200	\$ 71,724,537,500	771,015	\$ 65,042,040,000	\$ 194,121,846,600	\$ 20,020,091,600

Once the initial direct employment and/or sales figures have been established, they are entered into a model linked to the IMPLAN database. The IMPLAN data are used to generate estimates of direct wages and output in each of the three sectors: production, wholesaling, and retailing. IMPLAN was originally developed by the US Forest Service, the Federal Emergency Management Agency, and the Bureau of Land Management. It was converted to a user-friendly model by the Minnesota IMPLAN Group in 1993. The IMPLAN data and model closely follow the conventions used in the “Input-Output Study of the US Economy,” which was developed by the BEA.

- ❖ **Wages:** Data from the US Department of Labor’s ES-202 reports are used to provide annual average wage and salary establishment counts, employment counts and payrolls at the county level. Since this data only covers payroll employees, it is modified to add information on independent workers, agricultural employees, construction employees, and certain government employees. Data are then adjusted to account for counties where non-disclosure rules apply. Wage data include not only cash wages, but health and life insurance payments, retirement payments and other non-cash compensation. They include all income paid to workers by employees. Further details are available from IMPLAN at <http://www.implan.com>.
- ❖ **Output:** Total output is the value of production by industry in a given state. It is estimated by IMPLAN from sources similar to those used by the BEA in its RIMS II series. Where no Census or government surveys are available, IMPLAN uses models such as the Bureau of Labor Statistics Growth model to estimate the missing output.
- ❖ **Taxes:** The model includes information on income received by the Federal, State and Local Governments. The model produces estimates for the following taxes at the Federal Level: Corporate income, payroll, personal income, estate, gift, and excise taxes; customs duties; and fines, fees, etc. state and local tax revenues include estimates of: Corporate profits, property, sales, severance, estate, gift, and personal income taxes; licenses; fees; and certain payroll taxes. Note that tax data have been impacted by the response of federal, state, and local governments to COVID-19. Many of the relief programs instituted by the government included tax subsidies. These include payments under the EIDC, and PPP programs, as well as tax subsidies such as child credits. These show up in the models as negative taxes. Since tax data are always lagging (2022 tax payments are not recorded until 2023), these negative taxes are still shown in the data.

The 2023 model reflects the best data and modeling techniques available now and should provide a very accurate measure of the economic footprint of the industry today. Any errors are unintentional and are strictly those of John Dunham & Associates.

### IMPLAN Methodology<sup>22</sup>

Francoise Quesnay, one of the fathers of modern economics, first developed the analytical concept of inter-industry relationships in 1758. The concept was actualized into input-output analysis by Wassily

<sup>22</sup> This section is paraphrased from IMPLAN Professional: Users Guide, Analysis Guide, Data Guide, Version 2.0, MIG, Inc., June 2000.

Leontief during the Second World War, an accomplishment for which he received the 1973 Nobel Prize in Economics.

Input-output analysis is an econometric technique used to examine the relationships within an economy. It captures all monetary market transactions for consumption in a given period and for a specific geography. The IMPLAN model uses data from many different sources – as published government data series, unpublished data, sets of relationships, ratios, or as estimates. IMPLAN, Inc. gathers these data, converts them into a consistent format, and estimates the missing components.

There are three different levels of data generally available in the United States: Federal, state and county. Most of the detailed data is available at the county level, and as such there are many issues with disclosure, especially in the case of smaller industries. IMPLAN overcomes these disclosure problems by combining a large number of datasets and by estimating those variables that are not found. The data is then converted into national input-output matrices (Use, Make, By-products, Absorption and Market Shares) as well as national tables for deflators, regional purchase coefficients and margins.

The IMPLAN Make matrix represents the production of commodities by industry. The Bureau of Economic Analysis (BEA) Benchmark I/O Study of the US Make Table forms the bases of the IMPLAN model. The Benchmark Make Table is updated to current year prices and rearranged into the IMPLAN sector format. The IMPLAN Use matrix is based on estimates of final demand, value-added by sector and total industry and commodity output data as provided by government statistics or estimated by IMPLAN. The BEA Benchmark Use Table is then bridged to the IMPLAN sectors. Once the re-sectoring is complete, the Use Tables are updated based on the other data and model calculations of interstate and international trade.

In the IMPLAN model, as with any input-output framework, all expenditures are in terms of producer prices. This allocates all expenditures to the industries that produce goods and services. As a result, all data not received in producer prices is converted using margins which are derived from the BEA Input-Output model. Margins represent the difference between producer and consumer prices. As such, the margins for any good add up to one. If, for example, 10 percent of the consumer price of drones is from the purchase of electricity, then the electricity margin would be 0.1.

Deflators, which account for relative price changes during different time periods, are derived from the Bureau of Labor Statistics (BLS) Growth Model. The BLS model is mapped to the 546 sectors of the IMPLAN model. Where data are missing, deflators from BEA's Survey of Current Businesses are used.

Finally, one of the most important parts of the IMPLAN model, the Regional Purchase Coefficients (RPCs), must be derived. IMPLAN is derived from a national model, which represents the "average" condition for a particular industry. Since national production functions do not necessarily represent particular regional differences, adjustments need to be made. Regional trade flows are estimated based on the Multi-Regional Input-Output Accounts, a cross-sectional database with consistent cross interstate trade flows developed in 1977. These data are updated and bridged to the 546 sectors of the IMPLAN model.

Once the databases and matrices are created, they go through an extensive validation process. IMPLAN builds separate state and county models and evaluates them, checking to ensure that no ratios are outside of recognized bounds. The final datasets and matrices are not released before extensive testing takes place.

## **Appendix A**

### **Drone Service Providers Alliance Survey**

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In January and February of 2023 members of the Drone Service Providers Alliance (DSPA) were surveyed about their use of drones in commercial operations. The survey was conducted using Alchemer surveying software, with links to the survey sent out using the organization's mailing lists and external communications. The Drone Service Providers Alliance represents (primarily) small businesses that are at least partly dependent on drone usage for their business endeavors. More than 500 of the Alliance's members responded to the survey.

The responses provided data that were statistically significant, with a margin of error of +/- 4.37 percent.<sup>23</sup>

The survey questions are shown below.

#### DSPA Survey Instrument

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### **2023 Drone User**

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#### ***Drone Use Survey***

**Thank you for completing this survey. We are working to determine how drones are being used and gather information on the reach of the drone industry in the United States. A big thank you to DJI for helping sponsor this survey.**

**Data is being collected by John Dunham & Associates (JDA), a U.S. based research firm. All of the responses will be maintained in strict confidence by JDA. No individually identifiable data or survey response will be made available to anyone, organization, or company. The only unique information that will be shared with Drone Service Providers Alliance (DSPA) will be contact information.**

**If you have any questions related to the survey, please feel free to contact Lia Tachiquin at JDA. Her email is [alt@guerrillaeconomics.com](mailto:alt@guerrillaeconomics.com). For more information on the DSPA, please go to <https://www.dspalliance.org/>**

**Kenji Sugahara  
CEO/President  
Drone Service Providers Alliance**

**Vic Moss  
COO/Vice President  
Drone Service Providers Alliance**

**Sharon Rossmark  
CEO Women & Drones**

**Greg Reverdiau**

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<sup>23</sup> At the 95 percent level.

**Co-founder and Lead Instructor  
Pilot Institute**

**1) What is your primary line of business?**

For example, photography, real estate, engineering, construction, surveying.

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**2) If you know it, what is the primary 6-digit NAICS code for your business?**

[Search NAICS code here.](#)

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**3) Is your company a drone focused business and/or do you use drones as part of your business?**

Yes

No

**4) Does your business operate drones in the United States?**

Yes

No

**5) How many drones does the company operate for commercial purposes?**

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**6) How many positions does your business have that are related to drone use and how many hours per week (on average) do these people use drones?**

Please enter the number of full-time employees, number of part-time employees and subcontractors you employ. For each group, please enter the TOTAL number of hours per week that ALL employees would be utilizing drones as part of their job function. A response is required for at least one box in each column.

	<b>Number</b>	<b>Hours Using Drones</b>
<b>Full Time</b>		
<b>Part Time</b>		
<b>Subcontractor</b>		

**7) Please indicate the tasks that your business uses drones for. (Please enter the percentage of drone use for each task - total must add to 100 percent.)**

If selecting "Other" please define task in the comments box.

- \_\_\_\_\_ Agricultural Inspections
- \_\_\_\_\_ Infrastructure Inspections
- \_\_\_\_\_ Surveying
- \_\_\_\_\_ Mapping
- \_\_\_\_\_ Videography/Photography
- \_\_\_\_\_ Other

**Comments:**

**8) Please indicate the brands of drones that your company uses for business. (Please indicate the percentage of use by brand - total must add to 100 percent.)**

**If selecting "Other" please define what brand(s) in the comments box.**

- \_\_\_\_\_ Autel
- \_\_\_\_\_ DJI
- \_\_\_\_\_ Skydio
- \_\_\_\_\_ Sony
- \_\_\_\_\_ Yuneec
- \_\_\_\_\_ Other

**Comments:**

**9) Would your firm be able to stay in business without the availability of drones manufactured by Autel, DJI or Yuneec?**

- Yes
- No

**Comments:**

**Now please answer a couple of quick questions about your firm. This will help us to better analyze the data.**

**10) What is your role in the business? (Please choose all that apply)**

- Owner
- Employee
- Contractor (1099)

( ) Other - Write In: \_\_\_\_\_

**11) Company information.**

Company name: \_\_\_\_\_

Zip code: \_\_\_\_\_

Email address: \_\_\_\_\_

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***Thank You!***