# AEROSPACE | DEFENSE | GOVERNMENT | SECURITY

MERGERS & ACQUISITIONS UPDATE 2022 – YEAR IN REVIEW AND OUTLOOK

CAPSTONE PARTNERS

# AEROSPACE | DEFENSE | GOVERNMENT | SECURITY MERGERS & ACQUISITIONS UPDATE 2022

## Year in Review and Outlook

Capstone Partners is pleased to share its Aerospace, Defense, Government, & Security (ADGS) Mergers & Acquisitions Update 2022: Outlook and Year in Review. This report combines discussion on the current environment and a review of last year including merger & acquisition (M&A) activity.

### What's Inside:



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### STRENGTH IN TECHNOLOGY AND DEFENSE OFFSET COMMERCIAL AEROSPACE WEAKNESS

**Industry M&A activity, earnings, and valuation metrics rebounded to pre-pandemic levels, but this disguises significant differences between subsegments:**

- Commercial Aerospace eyes recovery from COVID downdraft.
- Defense spending sees renewed focus.
- Government IT fueled by advanced technology democratization
- Cybersecurity as one of the fastest growing industries.
- Simulation & Training evolves through technology developments and cost advantages.
- World events and technology advances are likely to drive further M&A.

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- Mergers & Acquisitions
- Divestures & Sales of Businesses
- Raising Debt & Equity Capital
- Refinancing & Restructuring

To learn more about Capstone Partners Aerospace, Defense, Government & Security (ADG&S) Group or to discuss the content of this report please do not hesitate to get in touch.

# OVERVIEW

## 1 STRENGTH IN TECHNOLOGY AND DEFENSE OFFSET COMMERCIAL AEROSPACE WEAKNESS

**Aerospace & Defense (A&D) sector M&A activity, earnings, and valuation metrics rebounded to pre-pandemic levels, but this disguises significant differences between subsectors.**

Strength in technology and defense offset commercial aerospace weakness:

- Overall industry public company earnings increased 22% in 2021 and returned to pre-pandemic levels.
- Prime Defense, Defense IT, and Defense Electronics all surpassed 2019 earnings by a significant margin.
- Commercial Aerospace-related areas such as Component Manufacturing and Repair remained substantially below pre-COVID and MAX issue rates. Industry participants and commentators expect a full return by mid-2023.
- We expect continued M&A activity as: a return to commercial air travel causes sellers to re-emerge; increases in defense spending target peer threat and the broadening scope of warfare; and acquisitions capitalize on advances in emerging technologies.

### M&A OVERVIEW:

- **M&A activity rebounded to pre-pandemic levels with a 50% increase in the number of sector M&A transactions.**
- **Defense Systems & Navigation; Software, Cyber & Artificial Intelligence (AI); as well as Space and General Aviation were areas of M&A strength.**
- **Transaction valuation multiples ticked up, also returning to pre-pandemic levels. Size and sector were significant factors.**
- **Private equity groups remain important sector buyers.**

## Commercial Aerospace Eyes Recovery from COVID Downdraft

U.S. Aerospace industry shipments rose 7% in 2021 to reach 76% of 2018 pre-pandemic and MAX issue levels. A rebound in commercial orders took industry backlogs 2% above previous highs.

Commercial aircraft production is increasing and Boeing (NYSE:BA) resumed MAX shipments. At the same time, production levels are around half of what they were before issues began. Airbus A320 production is expected to increase from 45 a month to over 65 by mid-2023; Boeing MAX production is increasing from 27 to 31 a month early in 2022. Boeing severely lags Airbus (ENXTPA:AIR) with expected production rates, backlog, and deliveries at 60%, 67%, and 80% respectively of Airbus. Airbus delivered record net income in 2021, with profitability above 2018 highs while Boeing showed a third year of losses.

2021 passenger travel remained less than half 2019 levels, but by December 2021 U.S. domestic travel was down only 13% compared to 2019. With increasing fuel and other costs, airlines' ability to stoke demand through lower ticket prices is likely to face challenges, leaving them to rely on pent up consumer demand for leisure travel. By mid-2023, a full recovery to pre-pandemic levels is expected by suppliers and commentators. Airbus and Boeing's long term growth forecasts remain broadly unchanged, expecting 4% average annual passenger growth to 2040.

## COMMERCIAL AEROSPACE:

- **U.S Aerospace industry shipments rose 7% in 2021 to reach 76% of 2018 highs. Backlog exceeds previous peaks.**
- **Airbus and Boeing look to increase commercial aircraft production rates. Boeing severely lags Airbus across a breadth of measures.**
- **By December 2021 U.S. domestic travel was down only 13% vs. 2019, although 2021 global airline passenger miles were 42% of 2019 levels.**
- **By mid-2023 a full recovery to pre-pandemic levels is expected by suppliers & commentators. Long term airframe 4% growth forecasts remain unchanged.**

## Defense Spending Sees Renewed Focus

The March 2022 Consolidated Appropriations Act provides $782.5 billion in national security spending, a 5.6% increase over the previous fiscal year. President Biden released his fiscal year (FY) 2023 request, with a topline budget of $813 billion, up 4%.

In response to the Russian invasion of Ukraine, a separate $13.6 billion in emergency spending has been included in budget legislation for humanitarian and military aid. NATO (North Atlantic Treaty Organization) Allies are now facing up to the burden of the sharing pledge, to spend 2% of GDP (gross domestic product) towards defense. Germany, as the fourth largest economy with a commitment to increase from 1.5%, offers meaningful additional defense expenditure. For context, the U.S. has averaged 4.3% over the last 45 years (3.7% in 2020).

2021 Interim National Strategic Guidance to the Department of Defense identified China as the greatest long-term challenge to the U.S. ensuring continued investments in AI, hypersonic technology, cyber, and quantum computing. Space has also seen substantial expenditure, as a war fighting domain. In addition to commercial activity, which has fueled significant M&A as the nascent sector consolidates, defense primes, and emerging players add new technologies and personnel.

## DEFENSE:

- **5.6% increase in defense spending in 2022.**
- **Europe faces up to spending 2% of GDP on defense.**
- **China identified as greatest long-term threat.**
- **Technology advances and space ambitions drive M&A activity.**

## Government IT Fueled By Advanced Technology Democratization

Government IT witnessed an unprecedented level of dealmaking; a 40% increase in the number of middle market transactions surpassed even 2019's high water mark. Activity was fueled by technological advances and the maturation of disruptive SaaS (software as a service) business models. Strategic acquirers sought to match their access to government customers with emerging technologies to improve capabilities in accelerating areas of government investment, including: disruptive technological solutions, agile software development, data analytics, cloud computing & IT as a Service, machine learning & AI, and, of course, cybersecurity.

In what has traditionally been a staid, though large, market, we are now witnessing significant real growth. As we look to the future, emerging geopolitical realities will not only sustain current investments, but accelerate the modernization powershift already underway. The efficiency and performance born of customized software technologies, powered by AI and packaged as SaaS offerings, will change the nature of what is possible, unlocking new solutions to formerly intractable challenges. These efforts will be critical to liberating resources for critical investments in tactical capabilities, including C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance) and cyber operations, that directly impact the warfighter and transform the battlefield.

## Cybersecurity One of the Fastest Growing Industries

Cybersecurity has become one of the fastest growing industries as attack surfaces have expanded, with more devices connected to the internet, increased remote access/working, and growing geopolitical tensions. Threats have multiplied ranging from potential nation state attacks on critical power grid infrastructure, to criminals conducting ransomware attacks on small and mid-sized businesses and have resulted in average annual costs of $170,000, spurring the widespread adoption of cyber insurance. The total cost of cybersecurity breaches has skyrocketed to an estimated at $6 trillion in 2021 (larger than the GDP of every country in the world except the U.S. and China).

Expenditures to attack the problem have correspondingly multiplied across the landscape, from departments of defense, governments, large corporations and investors. The number of Cybersecurity M&A transactions rose over 20% in 2021 and the disclosed value of transactions increased almost threefold (300%). Strategic buyers accounted for 63% of transactions and private equity 37%, as firms face emerging technology trends including: adopting Secure Access Service Edge (SASE) network architecture, migrating to the Cloud, building Managed Security Service Providers (MSSP), integrating protections through Extended Detection & Response (XDR) and automating routine tasks through AI.

### GOVERNMENT IT SERVICES:

- **40% annual increase in deal activity, surpassing recent highs.**
- **Acquirers are adding emerging technologies in areas of accelerating government investment.**
- **Geopolitical realities will accelerate the modernization powershift already underway.**
- **Software technologies, powered by AI and packaged as SaaS offerings, change the nature of what is possible.**

### CYBERSECURITY:

- **Attack surfaces and threats have multiplied.**
- **The cost of breaches has skyrocketed.**
- **Substantial expenditures in facing emerging technology trends.**
- **Threefold increase in disclosed M&A transaction value.**

## Simulation & Training Market Evolves through Technology Advances and Cost Advantages

Simulation & Training M&A activity increased 34% over 2020 levels with strategic acquisitions expanding providers' capabilities in both Civil and Military markets.

In each case, expansion has been driven by 1). cost pressures and the significant savings advantages offered through simulation over active training and 2). technological advances providing the ability to simulate situations difficult to create in real life—whether those be dangerous crash-type scenarios or increasingly complex multi-domain operation conflicts.

Simulation demand has been further fueled by pandemic-related issues: in the military by cost constraints of active training following substantial government COVID-related expenditures, and for commercial airlines worsening long-term forecast pilot shortages in the face of early retirements during the pandemic.

## SIMULATION & TRAINING:

- **M&A activity surpasses pre-pandemic levels.**
- **Technology advancements enable training for situations difficult to create in the real world.**
- **Cost savings offered over live training continue to become increasingly important after height of the pandemic.**

## Future M&A Activity Across Subsegments Driven by World Events and Technology

Geopolitical, economic, and public health drivers of M&A include:

- A return to commercial air travel after the pandemic, causing company sellers to reemerge.
- Increased defense spending, as Russia's invasion of Ukraine unsettles Europe and brings peer threat into U.S. focus.
- The scope of warfare expands, from economic to infrastructure, and from cyberspace to outer space.

Advances in emerging technologies also fuel M&A:

- Larger firms access technology developments across a breadth of defense, IT, cyber and training.
- Developments are adopted to improve product & service capabilities, bringing benefits of commercial access, scale, and cost.

## FUTURE M&A ACTIVITY:

- **Event drivers: returning commercial air travel, increasing defense spending, expanding scope of warfare.**
- **Emerging technologies: access by larger firms to improve capabilities and commercial application.**

# MERGERS & ACQUISITIONS UPDATE

## 2 M&A ACTIVITY REBOUNDS TO PRE-PANDEMIC LEVELS

**A&D sector M&A activity, earnings, and valuation metrics rebound to pre-pandemic levels.**

**Weakness in Commercial Aerospace was offset as Defense and Technology activity reached new heights.**

- Sector public company earnings overall returned to pre-pandemic levels, although this disguises significant differences between subsegments.
- Prime Defense, Defense IT, and Defense Electronics all surpassed 2019 earnings by a significant margin.
- Commercial aerospace related areas such as components and repair were substantially below prior levels.

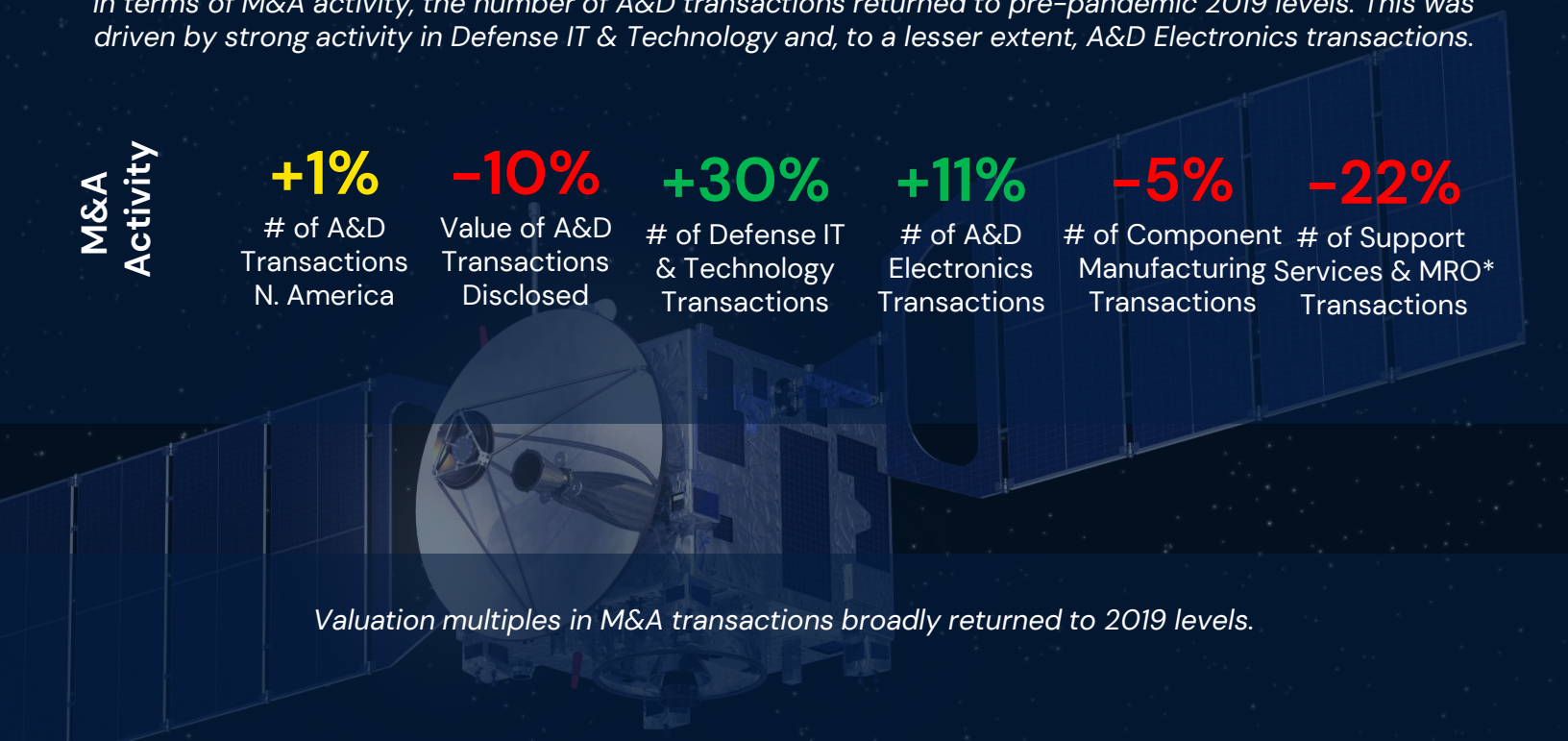
- **M&A activity rebounded to pre-pandemic levels with an almost 50% increase in the number of sector M&A transactions.**
- **Low numbers of transactions in 2020 reflected the pandemic-induced shut down in the 2nd & 3rd quarters.**
- **Defense systems & navigation; software, cyber & AI; as well as space and general aviation were areas of M&A strength.**
- **Valuation multiples in sector transactions rose by around half a turn in 2021 returning to pre-pandemic levels. Transaction size and sector were significant factors.**
- **Private equity groups remain important sector buyers as buy-and-build strategies became ever more prevalent.**
- **Founders comprised the majority of sellers, attracted by strong earnings and activity in certain subsectors. Perspective provided by the pandemic and discussion of potential tax changes likely also played a role.**

## By the Numbers – 2021 vs. Pre-Pandemic 2019 Activity

*In terms of M&A activity, the number of A&D transactions returned to pre-pandemic 2019 levels. This was driven by strong activity in Defense IT & Technology and, to a lesser extent, A&D Electronics transactions.*

### M&A Activity

- **+1%** # of A&D Transactions N. America
- **-10%** Value of A&D Transactions Disclosed
- **+30%** # of Defense IT & Technology Transactions
- **+11%** # of A&D Electronics Transactions
- **-5%** # of Component Manufacturing Transactions
- **-22%** # of Support Services & MRO* Transactions



*Valuation multiples in M&A transactions broadly returned to 2019 levels.*

### Valuation Multiples

- **-0.2x** A&D M&A Transaction Multiples
- **+0.2x** Acquisitions by PE Transaction Multiples
- **+0.2x** Public Company EV/EBITDA Multiples

*Overall, A&D public company earnings were comparable with 2019. Defense outperformed pre-pandemic levels while Commercial Aerospace continued to lag.*

### Public Company Earnings

- **+1%** A&D Public Co. Index EBITDA
- **+29%** Defense IT EBITDA
- **+12%** Prime Defense EBITDA
- **+11%** Defense Electronics EBITDA
- **-21%** A&D Components EBITDA
- **-37%** Airbus & Boeing EBITDA
- **-38%** MRO/Component Repair EBITDA

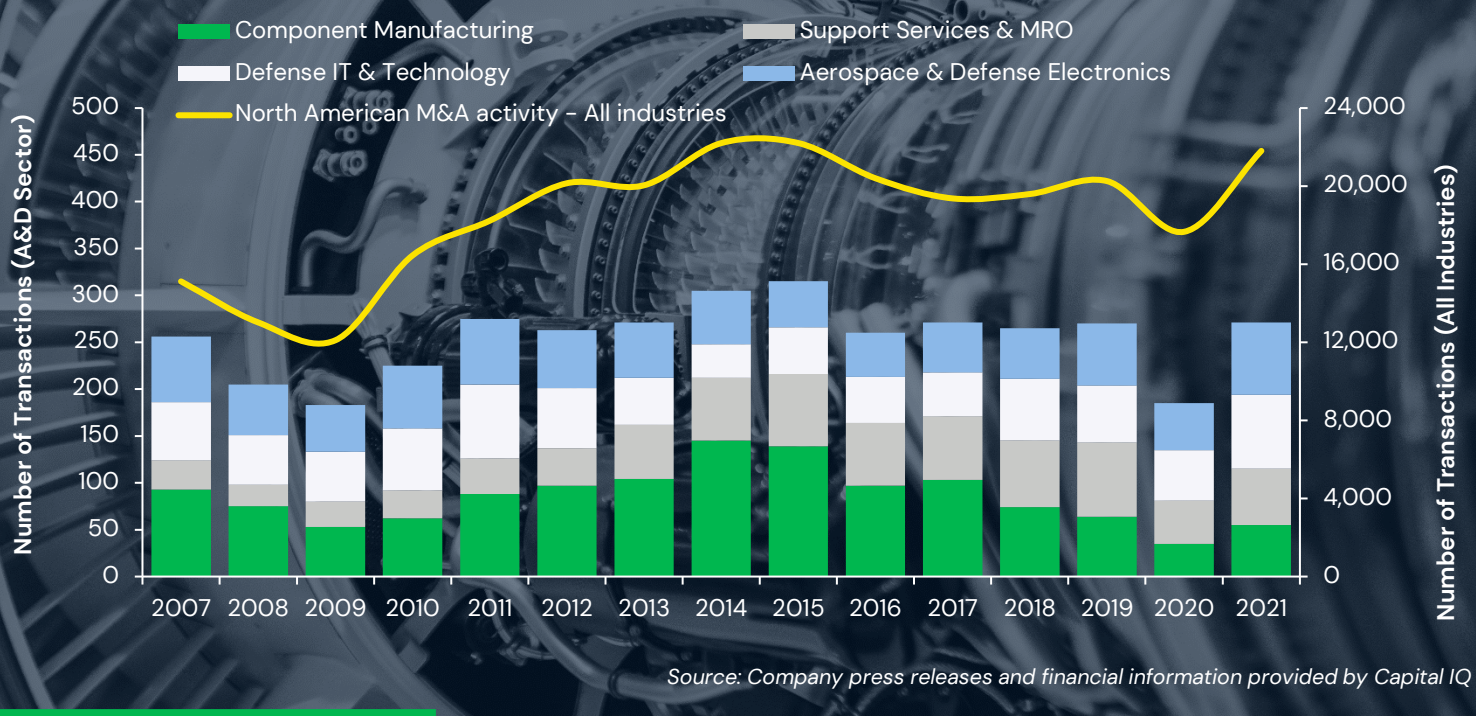
**MRO = maintenance, repair, and overhaul*
*Source: CapIQ and Pitchbook*

## Rebound in Sector M&A:

- The number of Aerospace & Defense M&A transactions increased 48% in 2021, rebounding to 1% above 2019 levels and 8% ahead of the average number over the past five years.
- This compares with a 14% increase in the number of M&A transactions across all industries in North America in 2021, which also rebounded to 2019 levels.

- **Number of A&D transactions increased 48% in 2021, rebounding to 2019 levels.**
- **Number of Defense IT & Technology, and Defense Electronics transactions reached new highs.**
- **Commercial Aerospace related segments showed lower M&A activity.**

### North American Aerospace and Defense M&A Activity




*Source: Company press releases and financial information provided by Capital IQ*

### By Subsector

**Component Manufacturing:** Includes mechanical, engine and structural components, as well as interiors and composites, finishing and fastening components. Buyers were primarily private equity (PE) or PE-owned companies as they consolidate the supply base.

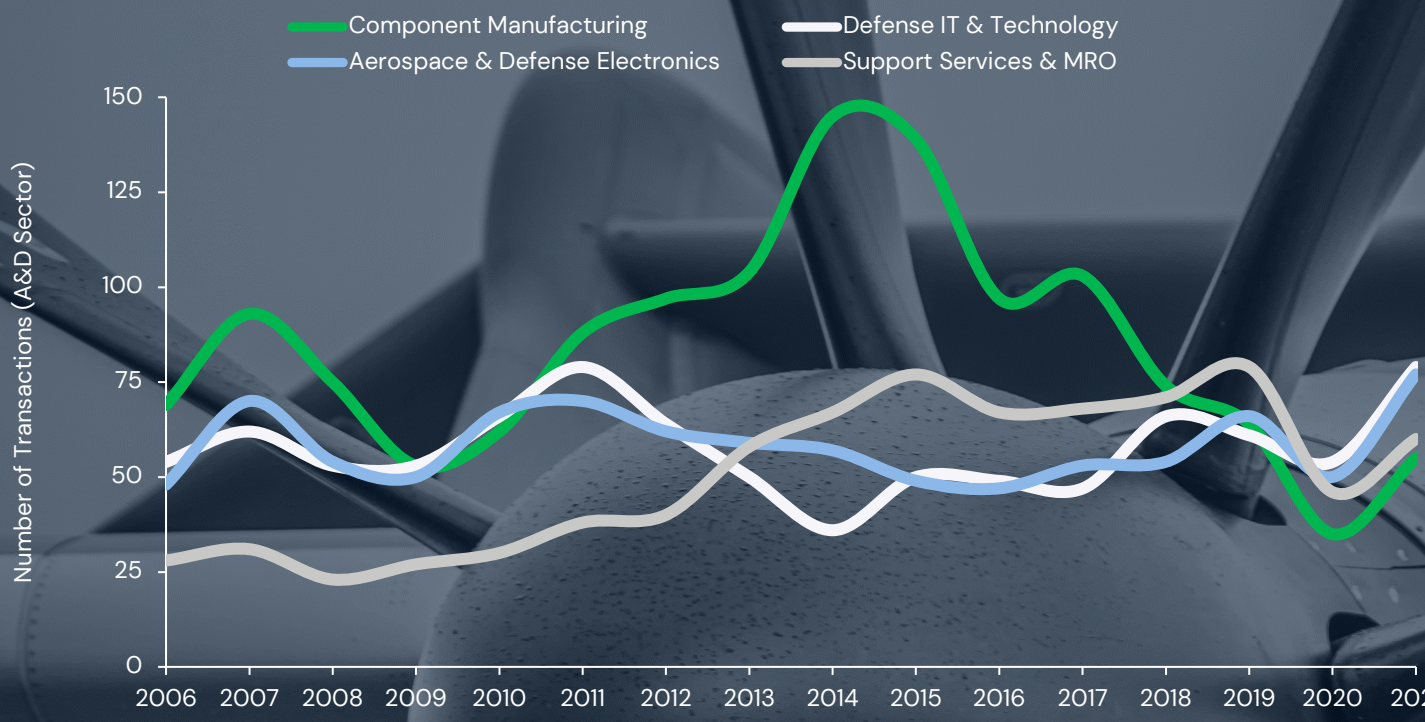
**A&D Electronics:** Includes a breadth of areas in flight controls, unmanned systems, and satellites. Transactions predominantly comprised strategic players using acquisitions to expand and build out their capabilities. This subsector had the lowest percentage of private equity buyers.

**MRO & Support Services:** Includes component repair; overhaul & test; supply chain management & distribution; and flight services. Almost 45% of acquirers were PE.

**Defense IT & Technology:** Comprises technical consulting, engineering services and software and was increasingly dominated by AI, cyber, C4ISR, and security. The broader trend of greater comfort and interest by private equity in technology was seen, as PE accounted for 40-50% of subsector transactions compared with a third in 2019.

Transactions within Defense IT & Technology, and Defense Electronics, which were the most insulated in 2020, reached record levels in 2021. The commercial side, which was severely impacted last year, rebounded from 2020 but unsurprisingly remains at lower levels.

## M&A Activity by Subsector




*Source: Company press releases and financial information provided by Capital IQ*

### Within Subsegments:

- Component Manufacturing transactions increased 74%, following a 45% decline in 2020 and accounted for 22% of total transactions. They continue to pace 75% below peak levels in 2014 when consolidation was at a high. Pre-pandemic, the decline was attributable to a shortage of acquisition targets following a long period of consolidation. In 2021, the makeup of Component Manufacturing transactions was weighted towards suppliers to the defense industry and less so to commercial, where potential sellers generally await a rebound in earnings. Anticipated forced sales by banks did not materialize as lenders also had an eye to future uplift aided by governmentt support.

- Support Services & MRO transactions rose 33% and accounted for 22% of sector transactions. 2021 saw a particular increase in private aviation and business jet services related transactions, with general aviation comprising almost 20% of subsector M&A.

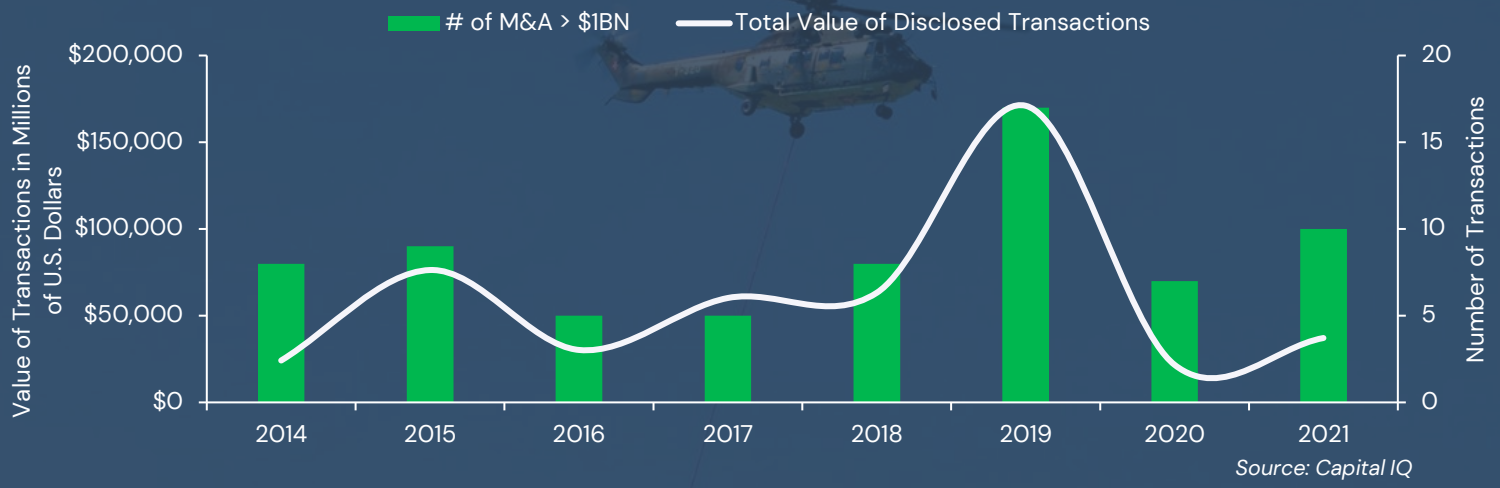
- A&D Electronics increased 44% compared with a 24% decline in 2020 and accounted for 26% of sector transactions. Comprised predominantly defense related systems with a substantial increase in space related transactions, including navigation.

- Defense IT & Technology transactions rose 46%, reaching new highs to account for the largest share of transactions.

The total value of disclosed A&D sector transactions increased 42% to within 10% of 2019 levels. The number of transactions greater than $1 billion rose to 10 from seven in 2020 with a total value of $37 billion versus $22 billion in 2020, $171 billion in 2019, and a five-year average of $71 billion.

## Value of A&D Sector Transactions

*(>1 Billion, 2014-2021)*




*Source: Capital IQ*

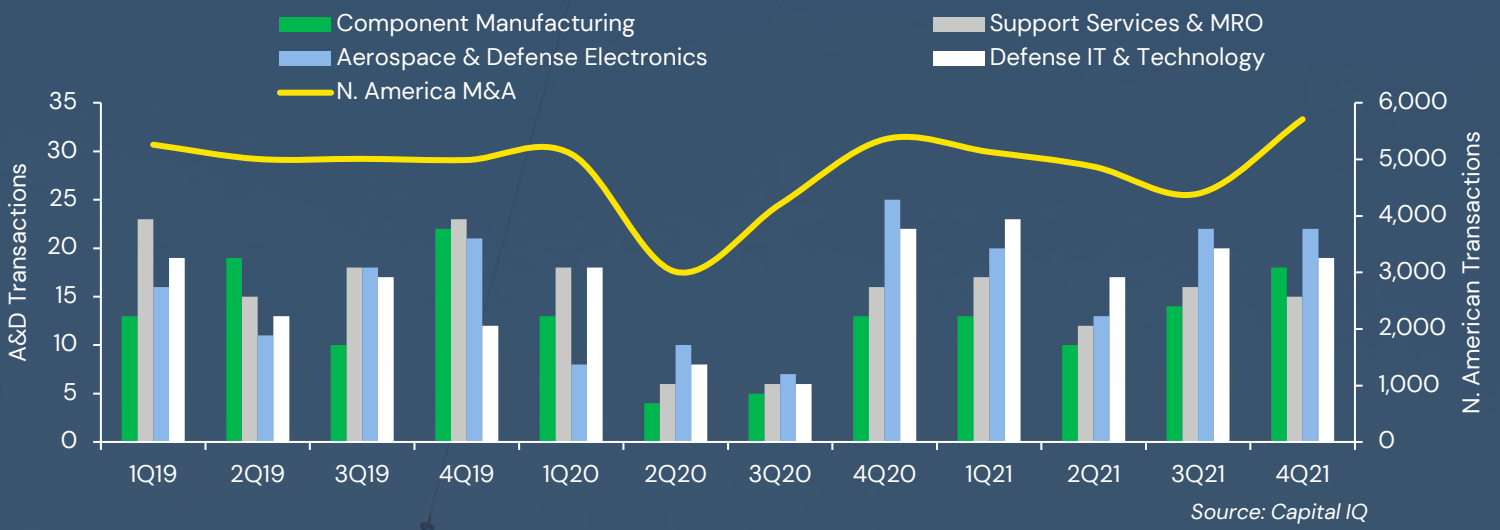
### Weak 2020 M&A Activity Reflects Q2 & Q3 Shut Down

Viewing M&A activity by quarter demonstrates how reduced totals for 2020 reflected the shut down in the second and third quarters of the year. By the final quarter of 2020, M&A picked up significantly, albeit somewhat lagging activity across all industries.

Defense IT & Electronics was the first to strengthen, led by Space and Defense systems as well as IT Consulting and Software including Cyber and AI. Component Manufacturing and Support Services, buoyed by Defense and General Aviation, showed a more gradual uptick through 2021 with a stronger final quarter.

## Transactions by Quarter

*(2019 – 2021)*




*Source: Capital IQ*

**Defense Systems & Navigation; Software; Cyber & AI; as well as Space Systems and General Aviation were increasingly sought after acquisition targets.**

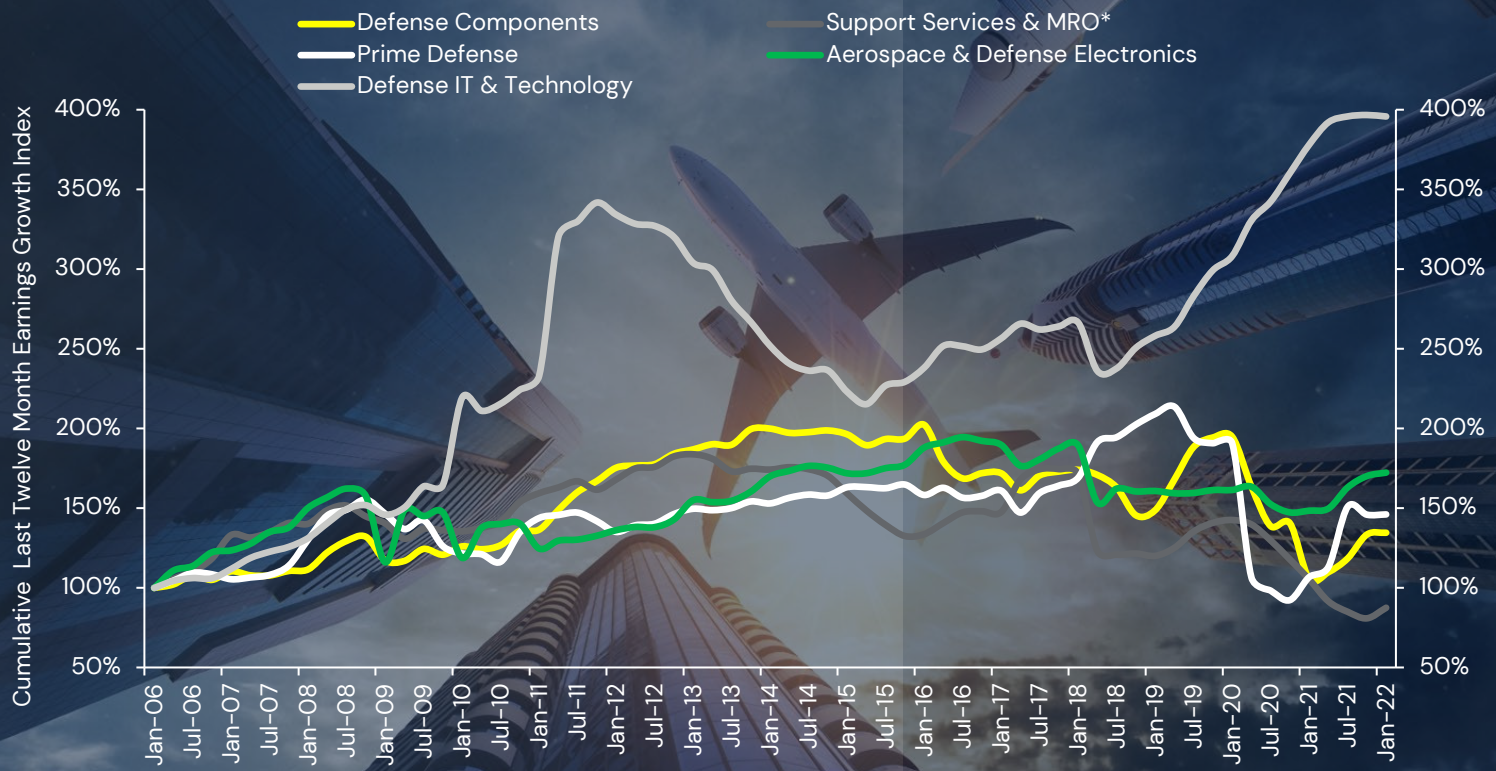
## Earnings and Valuation

- A&D public company EBITDA earnings increased 22% in 2021 and rebounded to pre-pandemic levels, being 1% above 2019 and 3% ahead of average five-year earnings. Our A&D index, however, disguised significant differences between subsectors.

- The sector lagged S&P 500 EBITDA earnings growth overall, which showed a Technology sector led 29% increase in 2021, to levels 13% above 2019 earnings and 17% higher than the five-year average.

- **Sector earnings overall returned to pre-pandemic levels, although this disguises significant differences between subsectors.**

### Aerospace & Defense Public Company Earnings by Sector




**MRO valuation skewed by weighting to Asia/Pacific market*
*Source: Capital IQ, company press releases*

## Prime Defense Revenue Led Revenue Gains

Revenue for our public company A&D Index increased 4% in 2021 on top of a 5% increase in 2020. This compares with a 13% increase for the S&P 500 in 2021 and a 4% decline in 2020.

Prime Defense contractors (excluding Airbus and Boeing) again experienced the largest revenue increase at 10%. Airbus and Boeing showed some recovery, with revenue increasing 1%. Revenue for Commercial Aerospace-related subsegments was, not surprisingly, down for the year led by MRO/Component Repair.

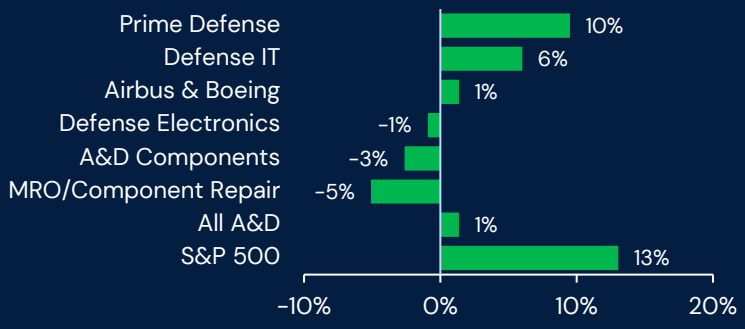
## Profitability Improvement

A&D EBITDA profitability improvement was aided by recovery at Airbus, where, despite a rebound, combined Airbus and Boeing EBITDA earnings were 37% lower than 2019 and five-year average earnings.

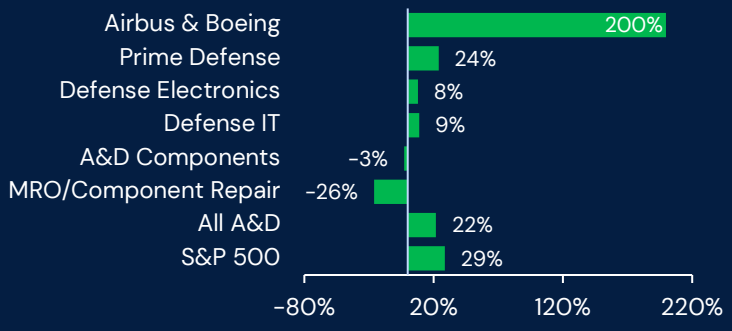
This contrasts with Prime Defense, where EBITDA increased 24% in 2021. to levels 13% above pre-pandemic profitability. Defense IT EBITDA was almost 30% above pre-pandemic earnings, and Defense Electronics 11%.

Commercial Aerospace-related earnings continued to suffer, with A&D Components falling 3% in 2021, 21% lower than 2019 and 12% below five-year average EBITDA. MRO/ Component repair fell 26% in 2021, to levels 38% below 2019 EBITDA and 25% lower than the five-year average.

### Year-Over-Year Revenue Percentage Change, 2021 vs 2020




### Year-Over-Year EBITDA Percentage Change, 2021 vs 2020

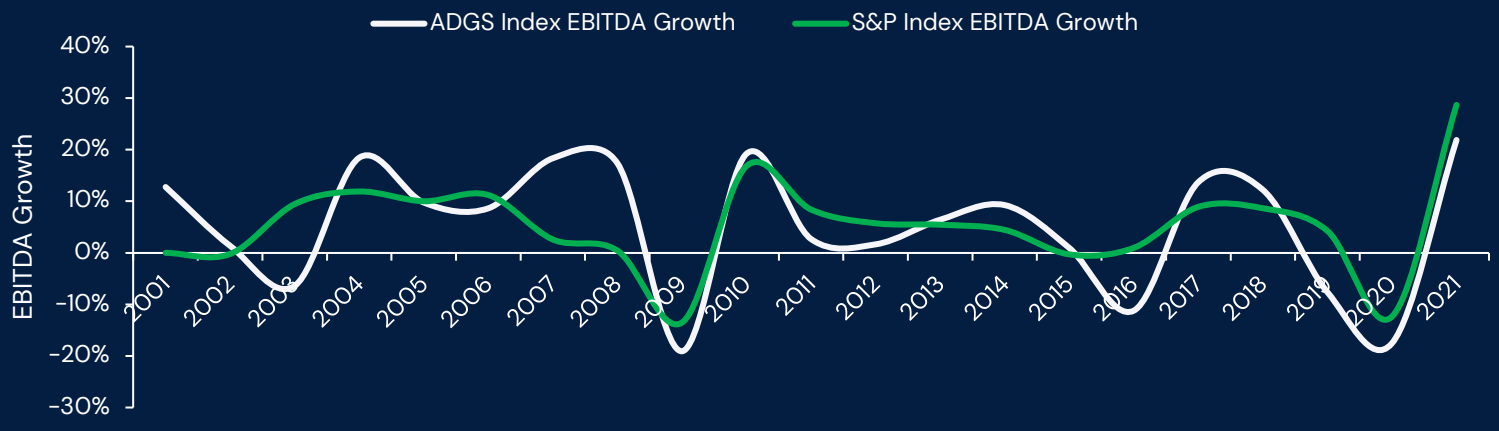



*Source: Company filings and Capital IQ*

EBITDA margin for public A&D companies increased to 16% compared with 14% in 2020 and 18% in 2019. The expansion was primarily driven by improvement at Airbus and continued margin expansion for both Prime Defense and Defense Electronics.

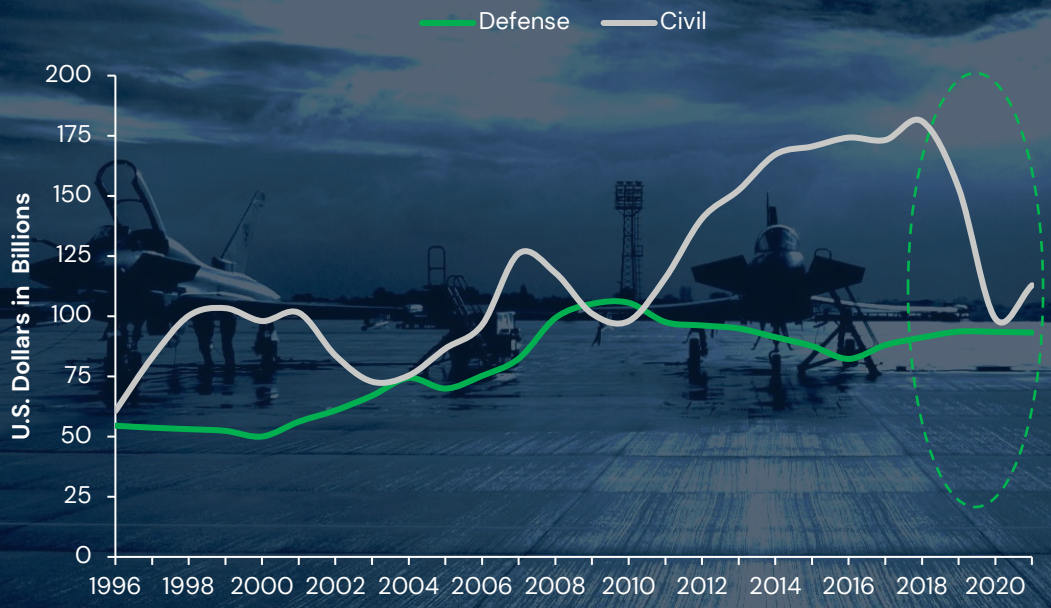
Despite diversity in cycles between Aerospace and Defense, our ADGS Industry Index overall, has traditionally shown greater earnings volatility than the S&P 500.

### Year-Over-Year EBITDA Growth for ADGS and S&P Indices




*Source: Company filings and Capital IQ*

## U.S. Aerospace Shipments Civil vs. Defense



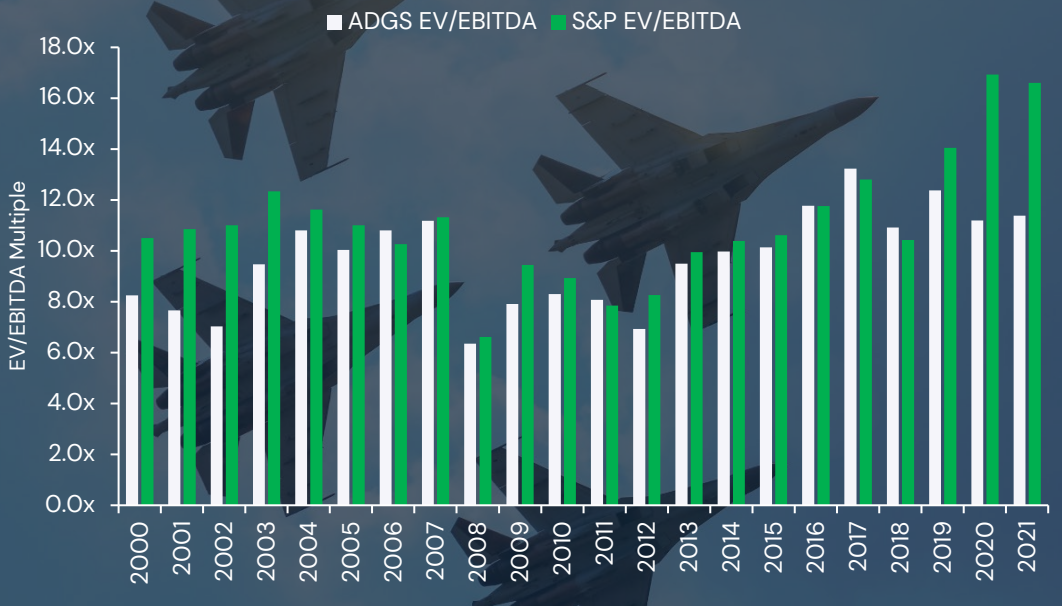

*Source: U.S. Census Bureau and Aerospace Industries Association (AIA)*

**As in previous downturns, industry production was supported by the diversification provided by defense.**

**Aerospace industry sales were historically split equally between Defense and Civil, often offsetting each other through downturns.**

**Production increases through the Commercial Aerospace boom changed that split to two-thirds Commercial Aerospace, one-third Defense. In 2020, production once more returned to a 50/50.**

## EV/EBITDA Multiples of ADGS Index vs. S&P 500




*Source: Capital IQ*

**A&D sector public market values trailed the S&P 500, increasing 6% in 2021 compared to a 28% increase for the S&P index.**

**Sector public company valuation multiples have remained consistent with last year, and significantly trailed the S&P which saw considerable increases in multiples paid, particularly for technology companies.**

## Public Company Values

Overall A&D sector public company enterprise value (EV) rose 6%, underperforming the S&P gain of 28% in 2021. Despite a persistent challenging environment, Commercial Aerospace valuations stabilized from last year's losses. Combined Airbus and Boeing EV increased 3% following a 22% decline in 2020.

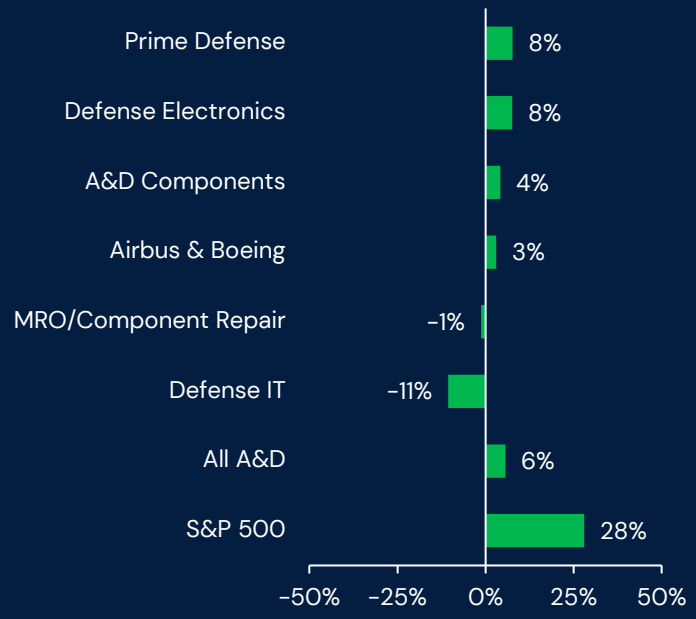
Sector public company EV/EBITDA multiples remained broadly stable at a median of 11.4x at year end 2021. The spread between subsector multiples varied between 10-15x, with higher multiples for better performing sectors as well as those with depressed earnings.

## Larger M&A Transactions Tied to Public Market Valuations

Multiples on disclosed transactions, which are frequently acquisitions of and by public companies, are typically more volatile, being generally larger companies with values more closely tied to those in public markets.

Valuations have increasingly diverged by size, with the spread between multiples paid on small and large transactions having widened considerably over the past ten years.

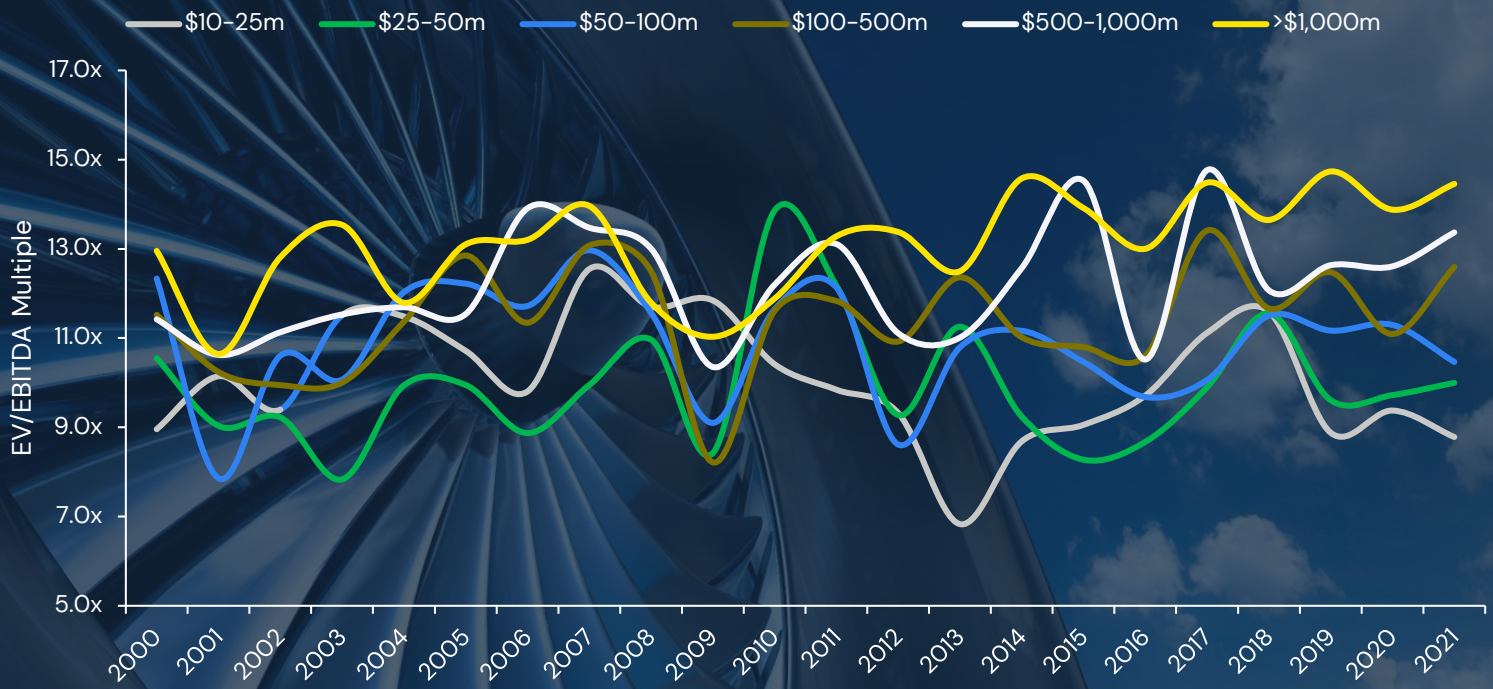
### Year-Over-Year EV Percentage Change, 2021 vs. 2020




*Source: Capital IQ*

### Disclosed M&A Transaction EV/EBITDA Multiples – All Industries

*(Often Paid by Acquisitions of Public Companies)*




*Source: Capital IQ*

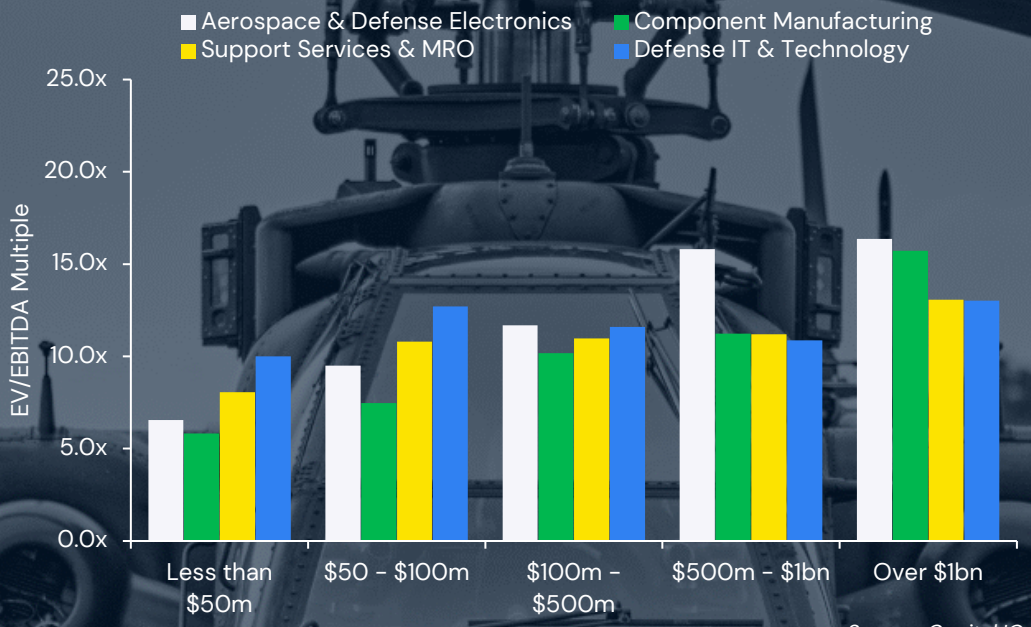
## M&A Transaction Multiples

In M&A transactions, size continued to be a significant factor in sector valuation. Multiples on large transactions have often become more than twice those of smaller transactions, as increasingly higher multiples have been paid for the largest deals.

### Valuations rose slightly as a result of higher multiples paid for Defense IT & Technology

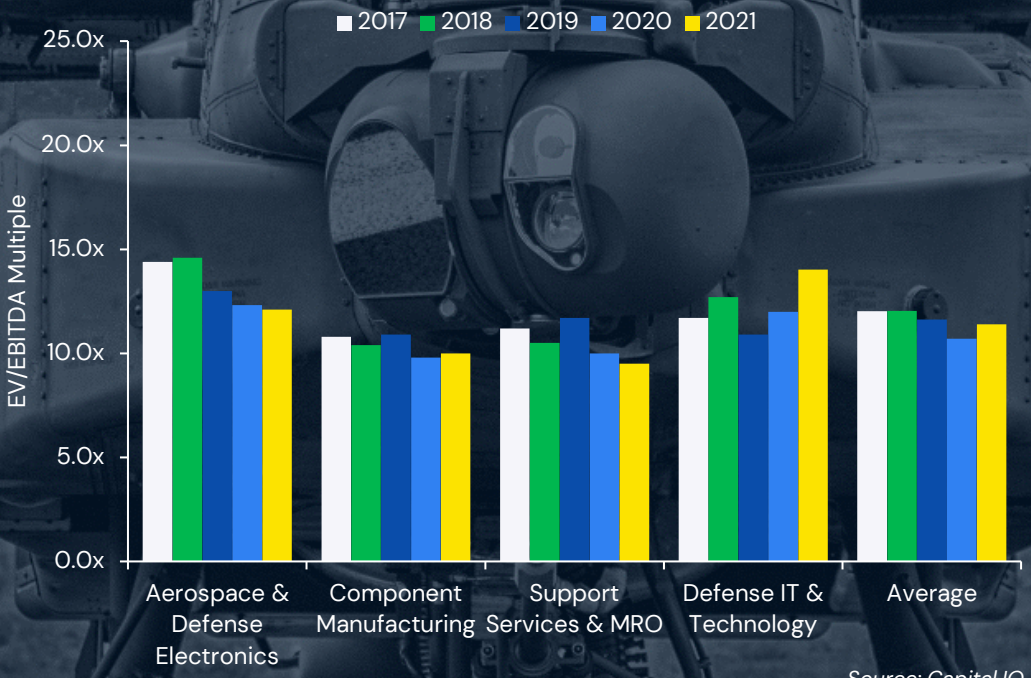
- In 2021 the average A&D transaction multiple across all sectors and transaction sizes rose to 11.4x compared to 10.7x in 2020.
- The increase was largely due to higher multiples in Defense IT & Technology.
- Average multiples in other subsectors remained broadly in line with 2020 levels.
- Aerospace & Defense Electronics showed the highest multiples by subsector, particularly for the largest transactions.

**Aerospace & Defense Transactions**
*(Enterprise Value by Size, 2016–2021)*




*Source: Capital IQ*

**Aerospace & Defense Transactions**
*(Enterprise Value Subsector, 2016-2021)*




*Source: Capital IQ*

**Valuation multiples paid in sector transactions rose by around half a turn in 2021 returning to pre-pandemic levels. Transaction size and sector were significant factors.**

## Transactions for the Aerospace & Defense sector overall (deals since 2016):

- Under $50 million took place around 6.5x EBITDA.
- Between $50-100 million were around 9.5x EBITDA.
- Between $100-500 million around 10.5x EBITDA.
- Between $0.5-1 billion traded around 12x EBITDA.
- Above $1 billion were above 14x EBITDA.

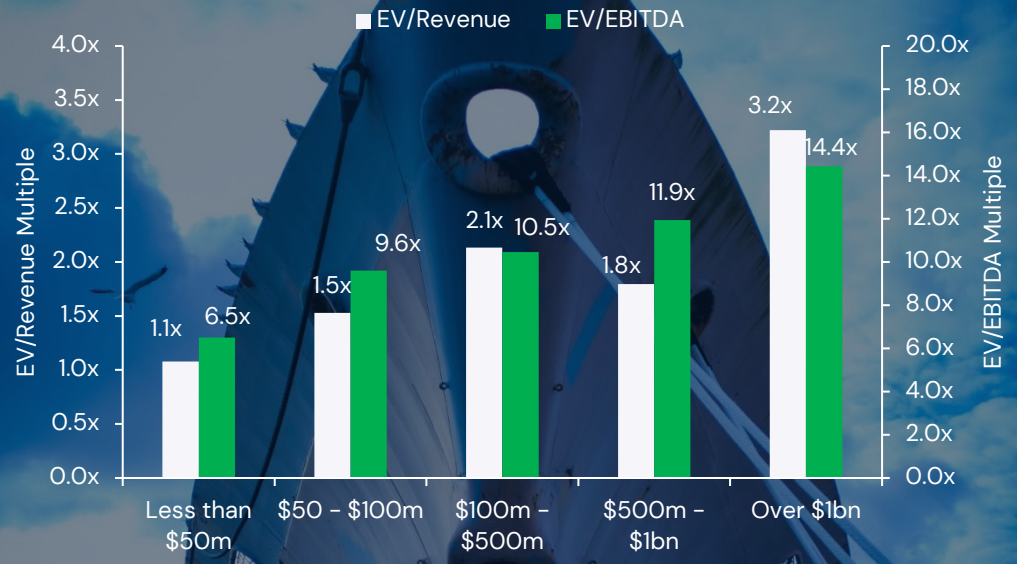
## Aerospace & Defense Component Manufacturing transactions show a similar trend (deals since 2016):

- Under $50 million took place around 6x EBITDA.
- Between $50-100 million were 7.5x EBITDA.
- Between $100 million and $1 billion traded around 10-11x EBITDA.
- Over $1 billion traded at almost 15x EBITDA.

Data above combined for years 2016-2021, using disclosed multiples on an unadjusted basis and typically feature acquisitions by public companies.

### Aerospace & Defense Transactions

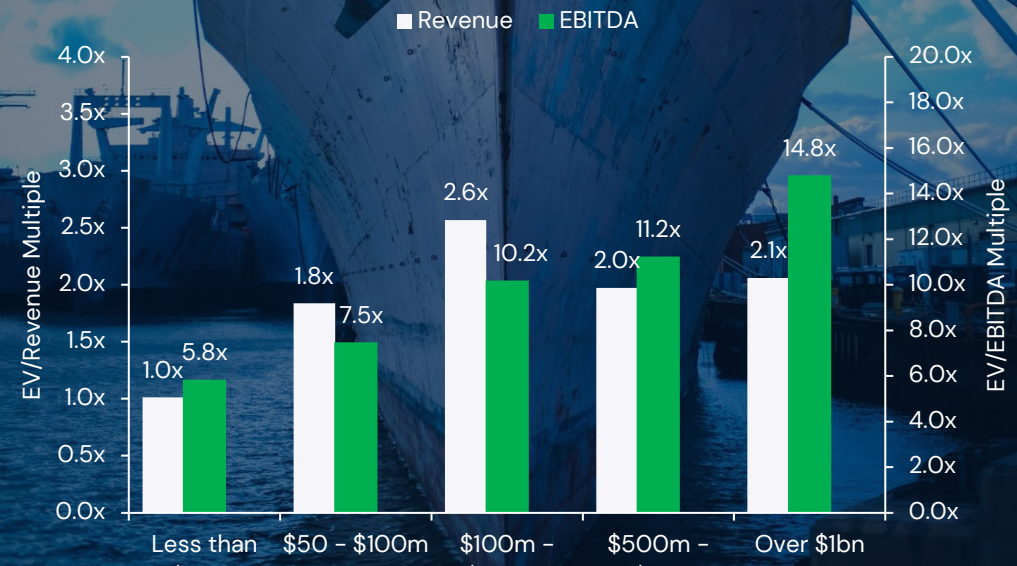
*(Enterprise Multiples by Size, 2016-2021)*




*Source: Capital IQ*

### Component Manufacturing Transactions

*(Enterprise Multiples by Size, 2016-2021)*




*Source: Capital IQ*

## Transaction size is a significant factor in valuation multiples

Multiples paid by private equity across all sectors continued to increase in 2021.

Much is made of transaction multiples, however, these are typically more consistent than what is widely perceived. Generally, It is the earnings part of the equation which proves more volatile.

Viewed through the lens of transaction size, acquisition multiples paid by private equity in M&A transactions through downturns, have been surprisingly stable, with changes often being a function of mix in transaction size.

In 2021, private equity broadly paid as a multiple of adjusted EBITDA in analysis conducted by GF Data®:

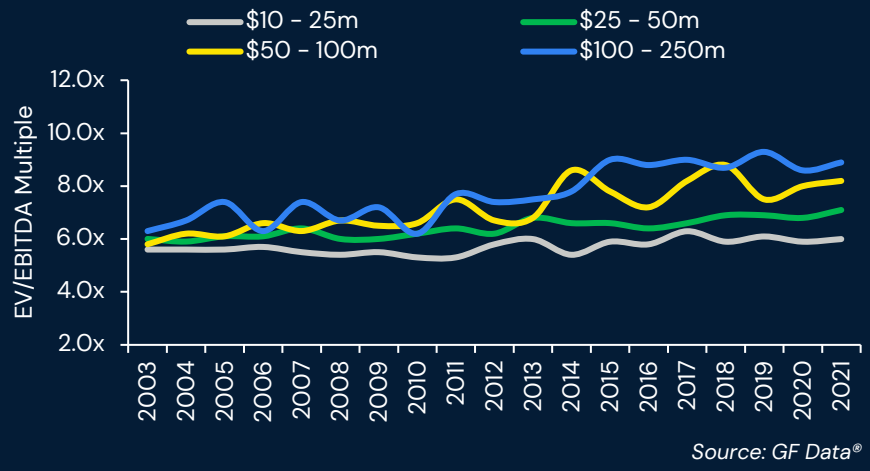
- 6x EBITDA for transactions of $10-25 million in enterprise value.
- 7x EBITDA for EV of $25-50 million.
- 8x EBITDA for EV of $50-100 million.
- 9x EBITDA for transactions with enterprise value between $100-250 million.

We have seen a fundamental upward rerating of transaction multiples for larger businesses over the past 15 years, fueled by increased availability of debt and private equity capital.

It was private equity groups' ability to arbitrage this spread in multiples through buy-and-build consolidation that attracted them to the Aerospace Component Manufacturing industry, combined with the perceived comfort provided by increasing air travel and the visibility from many years of backlog. Industry business owners who lived through previous cycles understood just how quickly such orders can disappear.

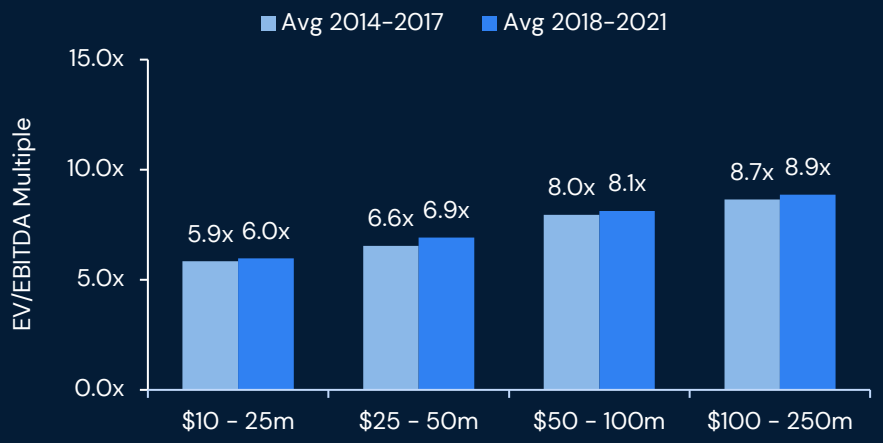
Private equity capital seeking investment is yet again at record highs, suggesting continued M&A activity.

### M&A Transaction EV/EBITDA Multiples Paid By PE, All Industries



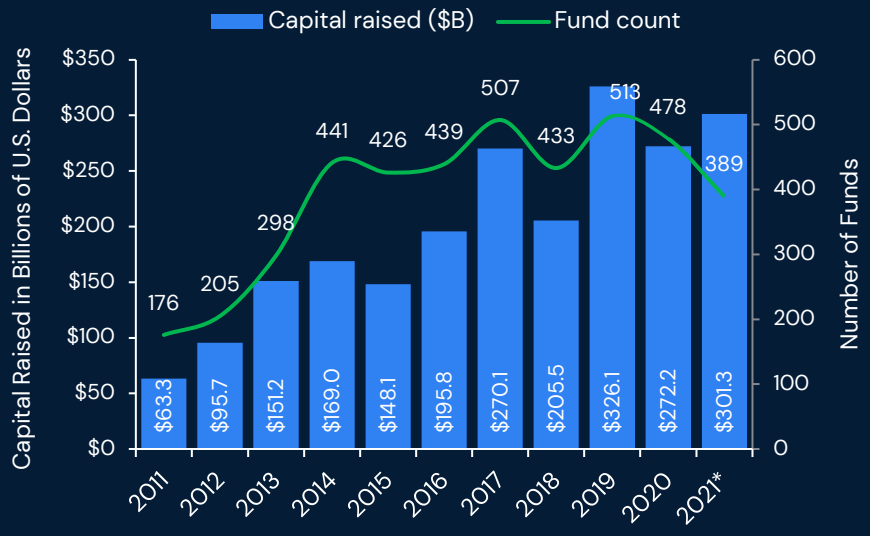

*Source: GF Data®*

### M&A Transaction EV/EBITDA Multiples Paid By PE, All Industries




*Source: GF Data®*

### PE Capital Available for Investment/Capital Raised




*Source: Pitchbook as of 12/31/2021**

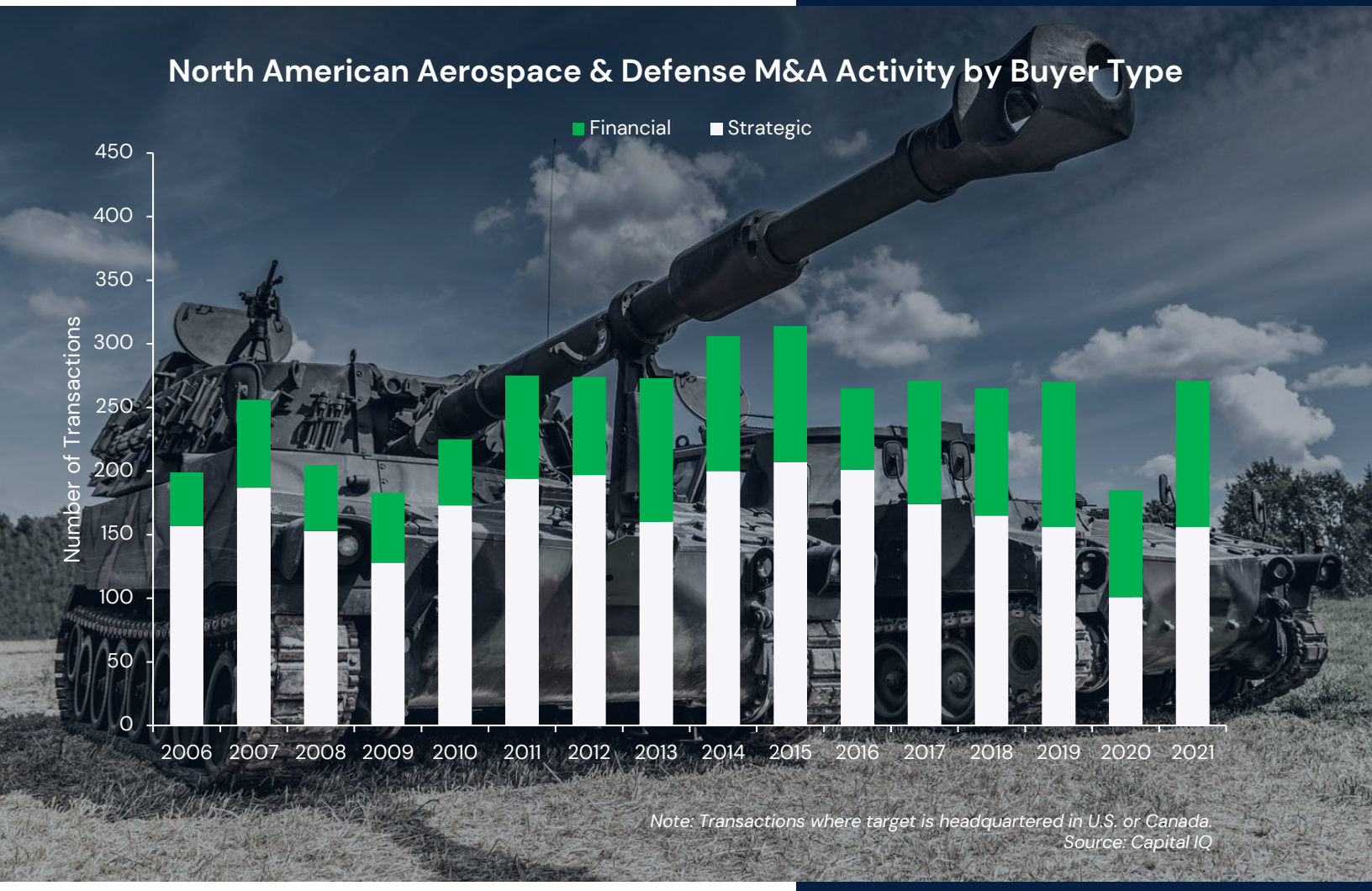
## Buyers and Sellers

### Private Equity has become integral to the sector

The percentage of acquisitions by PE or PE-owned firms has continued to increase.

- Private equity accounted for 43% of sector acquisitions in 2021, slightly below 2020, and significantly higher than the average of 35% of acquisitions over the past decade.
- The subsector with the highest private equity involvement continued to be Component Manufacturing, where 51% of acquisitions were by private equity or private equity-owned companies.
- Private equity fund raising has continued at near record levels. Funds continued to seek Commercial Aerospace Component acquisitions, but found few sellers at suppressed earnings levels.

- **Private equity remain important sector buyers as buy and build strategies become ever more prevalent.**




*Note: Transactions where target is headquartered in U.S. or Canada.*
*Source: Capital IQ*

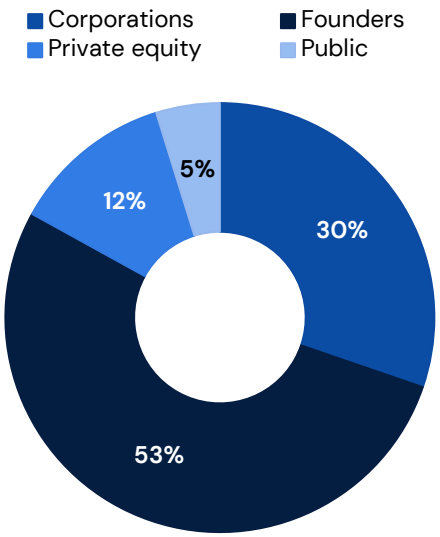
## Founders Were Top Sellers

Founders accounted for 53% of all sellers in 2021, an uptick from 44% the year before. Many sellers were from sectors outside Commercial Aerospace, where performance has been strong. Pressures of managing through a pandemic, together with the shift in personal priorities and the reflection that created, along with a much-discussed potential change in capital gains taxes, certainly caused founders to think about the future.

Strategic sellers declined to 30% as a percentage of sellers compared to 35% in the prior year. Private equity accounted for 12% of the seller pool compared with 10% in 2020 and 18% in 2019, which in part reflected their prior emphasis on Commercial Aerospace.

For management teams of founder-owned firms remaining with the business, new PE ownership typically means: greater pressure for growth to deliver the goals envisioned by the buyer; managing under a debt burden; increased process and structure around decision making; together with the potential to generate meaningful personal wealth.

**Sellers of North American A&D Businesses**
*(By Ownership Type, 2021)*




*Transactions where target is headquartered in U.S. or Canada*
*Sources: Company press releases and Capital IQ*

### Changing Motivations for Founders Pursuing a Sale

Founders typically choose to sell when times are good, and the business is at a high-water mark. Having lived through numerous cycles founders are often willing to wait for a rebound. It is therefore not surprising that sellers have come from the Defense, Space, and Technology sectors where earnings have continued to increase.

### Down Market Motivations

- Wanting to avoid the pressures of owning a business through another downdraft.
- Business simply isn't fun anymore.
- Need to satisfy cash requirements.

### Buoyant Market Motivations

- Approaching retirement age or a shift in personal priorities away from the business.
- Business has grown to a point where the financial demands of continuing to support growth in a capital-intensive industry become ever larger, and the business is no longer suitable for individual ownership. The capital required to take a business from $75 million to $150 million is very different from doubling a $15 million company, particularly with the perspective of continuing to risk everything when personal financial goals have otherwise been met.
- The business has reached a size where selling is a financially meaningful life-changing event, while building the business further would not materially change lifestyle. There is after all only so much money you can spend.

***Founders comprised the majority of sellers, attracted by strong earnings and activity in certain subsectors. Perspective provided by the pandemic and discussion of potential tax changes likely also played a role.***

## Uptick In Large Transactions

There were 10 transactions greater than $1 billion in 2021 compared with seven in 2020. Over the past five years, there has been an average of 8.5 transactions over $1 billion in the sector. Total value for transactions >$1 billion in 2021 was $37.2 billion versus $22 billion in the prior year and a five-year average of $71 billion.

## Top Transactions:

- Teledyne (NYSE:TDY), an instrumentation, imaging and electronics provider, completed the acquisition of imaging systems business FLIR Systems for $8 billion in May 2021. While the companies' business models are similar, their technologies are complementary with minimal overlap. The price tag represents 4.2x LTM revenue and 18.0x LTM EBITDA.

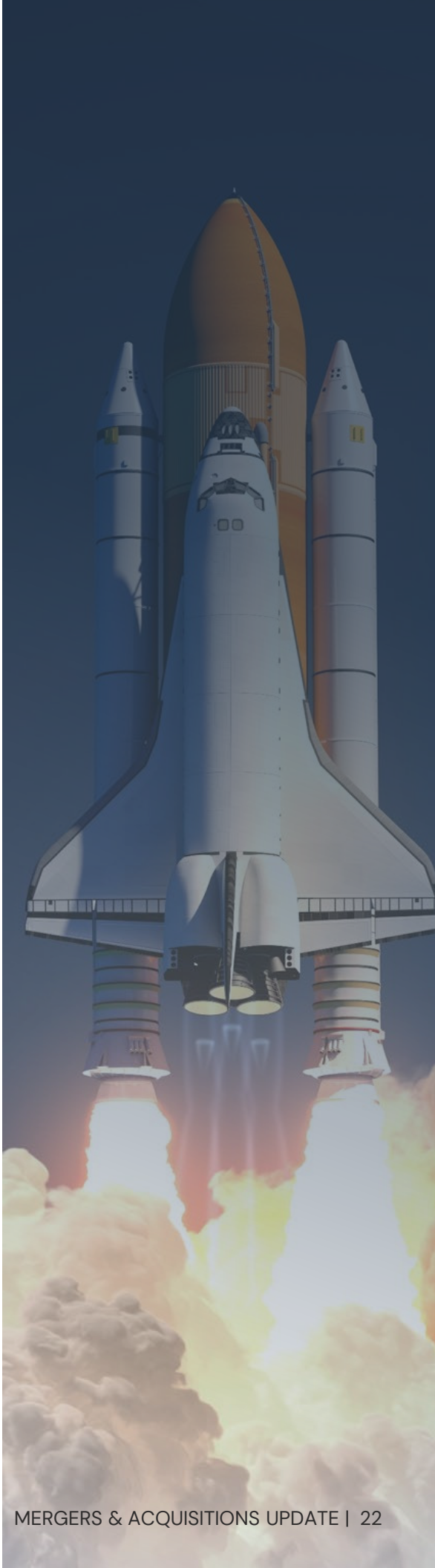
- Veritas' portfolio company, Peraton (IT focused services to government agencies), acquired Perspecta for $7.1 billion, or 11.3x EBITDA in May 2021. The acquisition comes on the heels of Veritas' previous purchase of Northrop Grumman's (NYSE:NOC) Federal IT and Mission Services business for $3.4 billion in December 2020. The acquisition of both companies has made Peraton one of the largest players in the Federal and Defense IT sectors.


## $1-5 Billion Transactions Include:

- KKR's (NYSE:KKR) acquisition of Atlantic Aviation FBO in September 2021 for $4.5 billion. KKR subsequently announced a merger between Atlantic and Ross Aviation two months later. Ross Aviation operates 19 FBOs across the United States and the Caribbean joining almost 70 Atlantic FBOs.
- Veritas' take-private acquisition of integrated solutions provider, Cubic Corporation (NYSE:CUB) for $3.4 billion or 14.7x EBITDA in May 2021.
- Huntington Ingalls' (NYSE:HII) acquisition of technology-driven service provider, Alion Science and Technology in August 2021, for $2.1 billion (12.2x EBITDA) from Veritas.
- Amentum's (Lindsey Goldberg and American Securities) acquisition of government operational support business, PAE Inc. (Nasdaq:PAE) for $1.9 billion or 8.7x EBITDA (October 2021).
- Ametek's (NYSE:AME) acquisition of mission critical embedded computing system provider, Abaco Systems, for $1.4 billion from Veritas Capital (April 2021).
- CAE's (NYSE:CAE) acquisition of L3Harris Technologies' (NYSE:LHX) Military Training business for $1.1 billion in June 2021.

## Top Private Equity Acquirers Expand Portfolio Companies

- Arcline Investment made 13 sector acquisitions during 2021 including nine Space-focused add-on acquisitions to its Quantic platform company. Quantic seeks to establish itself as the leading supplier of critical components for space and defense applications. The additional deals included three add-ons and one platform investment.
- Arlington Capital made nine sector acquisitions including four add-ons to advanced defense engineering service provider, BlueHalo, three platform acquisitions, and two other add-ons. The majority of its acquisitions were focused on Defense IT & Technology.
- AE Industrial completed seven sector transactions. Following the creation of Redwire (NYSE:RDW) in 2020, the space infrastructure business made three add-on acquisitions in 2021 before merging with special purpose acquisition company (SPAC), Genesis Park. The transaction was valued at $620 million pro forma enterprise value. AEI made four additional add-on acquisitions including two for Triman Industries (Support Services & MRO for military) and one each under its ThayerMahan (Defense Electronics) and UAV Factory (Defense Electronics) platform companies.
- Madison Dearborn completed four acquisitions in the A&D sector including platform ARCH Precision and a subsequent add-on, and one add-on for both LinQuest and AEVEX.
- American Industrial made three sector acquisitions including two component manufacturing add-ons for platform Crestview Aero, and one add-on to its Vertex platform.



# COMMERCIAL AEROSPACE

## 3 COMMERCIAL AEROSPACE EYES RECOVERY

### Overview

- U.S. Aerospace industry shipments rose 7% in 2021 to 76% of 2018 pre-pandemic & MAX issue levels. A rebound in commercial orders took industry backlogs to record highs.
- Commercial aircraft production is increasing. Boeing resumed MAX shipments although production rates are around half levels before issues began. Boeing severely lags Airbus in deliveries, production, backlog and profitability.
- 2021 passenger travel remained less than half 2019 levels, but by December 2021 U.S. domestic travel was down only 13% compared to 2019.
- Airbus and Boeing long term growth forecasts remain broadly unchanged, expecting 4% average annual passenger growth to 2040, with Asia being responsible for more aircraft sales then the mature markets of Europe and North America combined.

Other topics covered include:

- Impact of Russia sanctions on lessors, production, supply chains and airlines.
- MRO continues to suffer, cargo conversions provide a rare bright spot, while pressures to get aircraft back in the air are likely to increase.
- Sustainability gains awareness in the Commercial Aerospace industry.
- Business jet flights reach new heights.
- Aircraft lessors now own over half the commercial fleet.

### STATISTICS

- **U.S. Aerospace industry shipments +7% compared to 2021 to 76% of 2018 highs. Backlog+2% above prior peak.**
- **Increasing commercial aircraft production rates: Airbus A320 from 45 a month to over 65 by mid 2023; Boeing MAX production from 27 to 31 a month early in 2022.**
- **Boeing lags Airbus: expected production rates, backlog, and deliveries fell short at 60%, 67%, 80% respectively. Airbus delivered record net income, with profitability above 2018 highs while Boeing showed third year of losses.**
- **By December 2021 U.S. domestic travel was down only 13% versus 2019, although 2021 global airline passenger miles were 42% of 2019 levels.**
- **By mid-2023 a full recovery to pre-pandemic levels is expected by suppliers & commentators. Strong sector underpinnings of growth remain at macroeconomic and supply side levels.**

## Aerospace Industry Sales Improve

U.S. Aerospace industry shipments rose 7% in 2021 to 76% of 2018 pre-pandemic and MAX levels (84% of 2019):

- Civil shipments showed a 14% increase but were 62% of 2018 highs (74% of 2019).
- Defense shipments remained broadly stable and comprised 45% of the overall industry total.

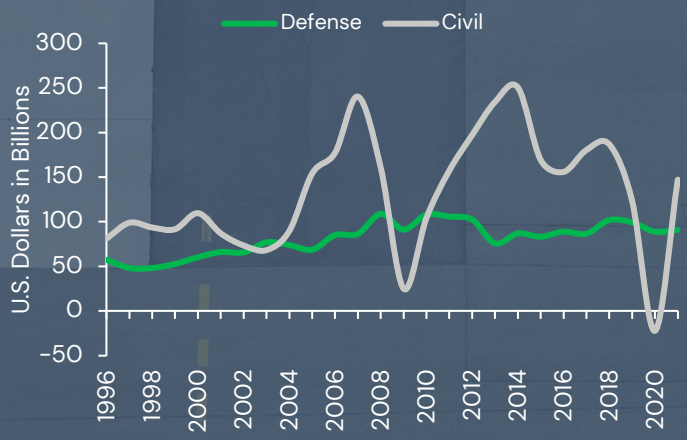
New orders rose more than 3.5x to 82% of 2018 levels (7% above 2019) following a rebound in Commercial Aerospace and driving industry backlog 2% above 2018 highs.

- Civil orders rose above 2019 to 94% of 2018 levels, taking backlog above 2018 peak (8% above 2019).
- Defense orders rose 2% to 89% of 2018 levels (92% of 2019), with fairly steady backlog.
- Industry backlogs equate to around 4 years production (1.2 years in defense and 6.3 years in civil) as reported by the U.S. Census Bureau, albeit on depressed 2021 civil output.

**U.S Aerospace Industry Shipments +7% compared to 2021 to 76% of 2018 highs**

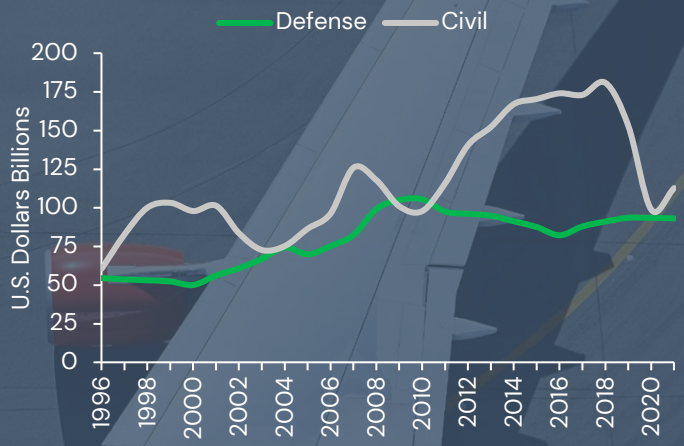
**U.S. Aerospace Industry Backlog +2% above previous highs**

### U.S. Aerospace New Order Totals



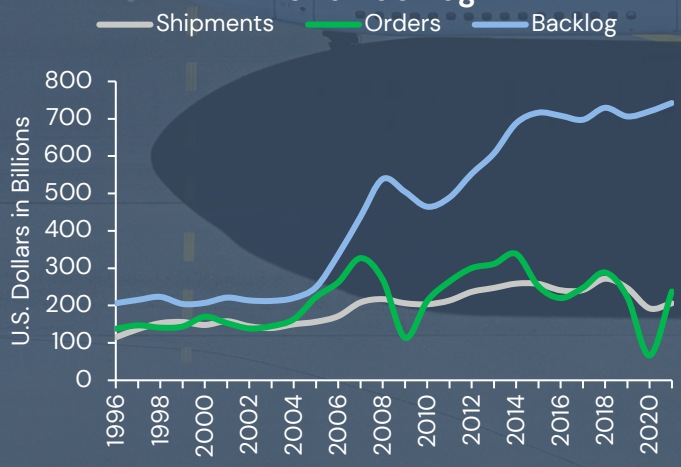

*Includes Aircraft & Parts; Search & Navigation; Communications Equipment*
*Source: U.S. Census Bureau and Aerospace Industries Association (AIA)*

### U.S. Aerospace Shipments, Civil vs. Defense



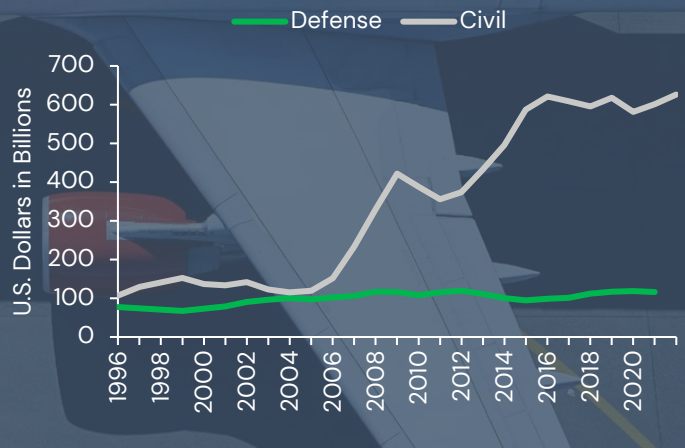

*Source: U.S. Census Bureau and AIA*

### U.S. Aerospace Shipments, Orders and Backlog




*Source: US Census Bureau and AIA*

### U.S. Aerospace Backlog Totals




*Source: US Census Bureau and AIA*

## Airbus and Boeing Increase Production

Boeing lags Airbus:

- Boeing resumed MAX shipments and production, but 787 Dreamliner deliveries remain stalled, and MAX production rates are around half levels before issues began.

- Although Boeing made up net orders lost in 2020 to match Airbus in 2021, expected 2022 single aisle production rates, backlogs, and deliveries remain substantially behind the European competitor being 60%, 67%, and 80% lower respectively. Boeing meanwhile carried almost three times as many aircraft in inventory at the year end, totaling 445.

Production rates for single aisle aircraft are expected to ramp at both Boeing and Airbus as recovery progresses and demand builds momentum. Roughly 55% of 2021 net new orders for Airbus and Boeing combined occurred in the last three months of the year. Cirium expect Airbus and Boeing deliveries to return to 2018 levels in 2023.

- Boeing delivered 245 737 MAX in 2021 and is currently producing 27 airplanes/month. Management expects to increase 737 MAX production to 31/month early this year. Boeing has 335 737 MAX airplanes in inventory and anticipates delivering most of those planes by the end of 2023. As a result of higher freighter demand, management expects to increase the combined 777/777MAX production rate to two to three per month and expect deliveries will be broadly in line with 2021 levels. Given quality control issues, 787 deliveries remain on pause. The Company expects to preform re-work on all of the 110 787 planes in inventory and for lower production rates to continue longer than anticipated with a gradual return to five airplanes per month over time.

- Airbus currently manufactures around 45 A320s per month and in mid-February 2022 announced the Company is considering ramping production rates above its targeted 65 per month by summer 2023 to potentially 70-75 per month by 2025. While demand is exceeding expectations for single aisle airplanes, the retooling of its supply chain after the pandemic slowdown, labor shortfalls and a surge in raw material and energy prices proves challenging. Airbus announced a joint investment with the Quebec government for $1.2 billion to increase the production rate of A220 aircraft from 5/month to 14/month by mid-2025. The Company expects to deliver almost 500 A220s over the next few years.

In 2021, Airbus and Boeing combined, delivered 951 jets during the year, a 32% increase over 2020 and 23% fewer than in 2019. Airbus has emerged as the world's largest plane maker in terms of deliveries, a title Boeing had long held until the 737 MAX crisis.

- Boeing delivered 340 aircraft (including 245 737 MAX), received net orders for 479, and ended 2021 with a backlog of 4,250 aircraft. This compares with: 157 deliveries, 474 lost orders, and backlog of 4,223 at the end of 2020; and 380 deliveries, 87 lost orders, and backlog of 5,406 in 2019.

- Airbus delivered 611 aircraft, slightly above projections, received net orders for 507 planes, and ended 2021 with a backlog of 7,082. This compares with: 566 deliveries, 286 net orders, and a backlog of 7,184 in 2020; and 2019 deliveries of 863, orders for 768 and backlog of 7,482 aircraft. For 2022, Airbus expects to deliver 720 commercial aircraft.

**Increasing commercial aircraft production rates:**

- **Airbus A320 from 45 a month to over 65 by mid-2023**
- **Boeing MAX production from 27 to 31 a month early in 2022.**

**Boeing lags Airbus:**

- **Expected production rates, backlog, and deliveries fall short at 60%, 67%, 80% respectively**
- **Max production 50% of levels before issues began.**

## Airbus and Boeing Financials

### Airbus posts record profit while Boeing reports third year of losses

- Airbus reported a 4% increase in revenues to $59 billion and a 185% increase in adjusted EBIT to $5.5 billion. Adjusted EBIT related to commercial aircraft increased $4.1 billion versus $702 million in 2020, mainly driven by delivery performance and efforts on cost containment and competitiveness. For 2022, Airbus expects adjusted EBIT of $6.3 billion and free cash flow before M&A and customer financing of $4 billion.

- Boeing reported an operating loss of $2.8 billion in 2021 compared with a $11.8 billion loss in 2020, primarily due to reduced losses in the Commercial Airplane (BCA) segment and higher earnings in Global Services (BGS). Improvements in BCA were due to the absence of a $6.5 billion reach-forward loss on the 777X program recorded in 2020, lower period expenses, lower 737 MAX customer considerations and higher 737 MAX deliveries, partially offset by a $3.5 billion reach-forward loss on the 787 program in 2021. The Company anticipates 2022 improved performance will be driven by the commercial market recovery, return to delivery for the 787 and 737 MAX in China, production system and delivery stability, and improved U.S.-China trade relations.

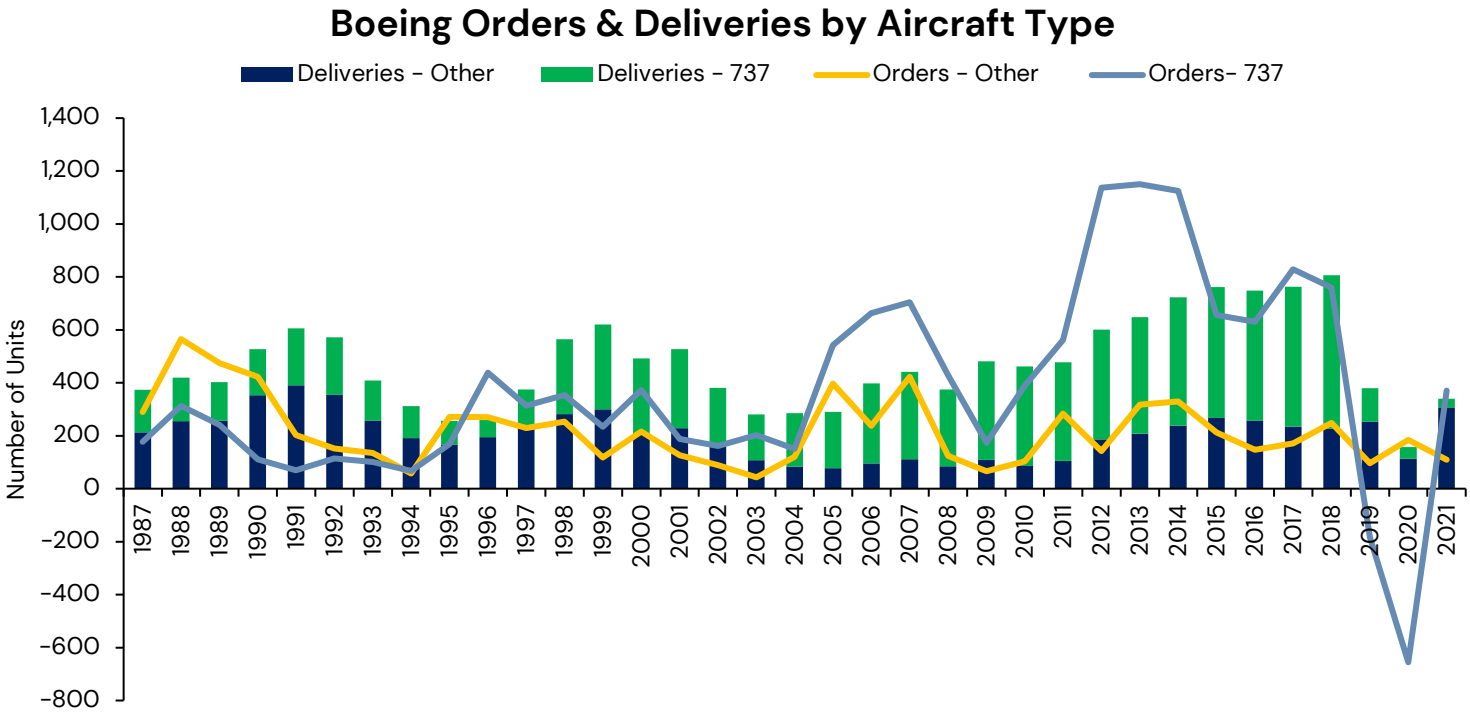
**2021 FINANCIALS**

**Airbus**

- **Record net income, with profitability measures above 2018 highs.**
- **Revenue 26% below 2019 levels.**

**Boeing**

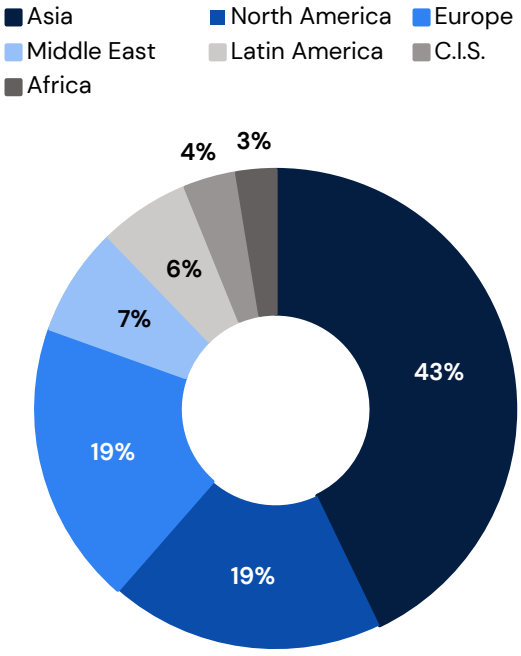
- **Third year of losses in operating and net income.**
- **Revenue 38% below 2018 highs.**




*Source: Boeing*

## Commercial Aircraft Sales Forecast by Geography

*(Airbus and Boeing, 2021-2040)*




*Source: Airbus and Boeing*

- Boeing and Airbus project passenger growth to average 4.0% and 3.9%, respectively, over the next 20 years with fleet growth around 3%. Combined, they expect 79% of deliveries to be single aisle.
- Forecasts are highly dependent on fleet expansion in Asia Pacific, which is expected to account for 43% of new deliveries (up from 40% in 2019).
- This is more than the mature markets of Europe and North America combined, which are each expected to account for 19%.
- In 2021, China accounted for 25% of Airbus' sales while Boeing's MAX woes halted shipments. Boeing expects regulatory MAX approvals in China to happen sometime in Q1 2021 and estimates almost 15% of all MAX deliveries will be delivered to China in 2022. Airbus expects 11% of its A320 fleet deliveries will be to China in 2022.
- However, with Cirium estimating China having 400 surplus aircraft, it is open to question if the country needs the new planes they are contracted to buy, at least in the near-term. It also raises questions around how long OEMs can rely on China as such a sizeable source of revenue.
- Comac's C919 single aisle is a further factor, and despite significant delays, can be expected to make inroads into China domestic sales at some point in the future.

## STRONG LONG TERM STRUCTURAL UNDERPINNINGS DRIVE PASSENGER GROWTH

### Macro Trend Demand Elements

- **GDP growth & urbanization**
- **Disproportionate increase in travel from expanding middle class in emerging markets**

### Supply-Side Factors Returning

- **Travel becoming more attractive due to: lower ticket prices, expansion of low-cost airlines, more direct flights, new routes, and improved timetables.**
- **Facilitated by technology developments: smaller planes which fly further with greater fuel efficiency; and airlines gaining higher load factors from improved focus, scheduling, and booking tools.**

### Pandemic Influences

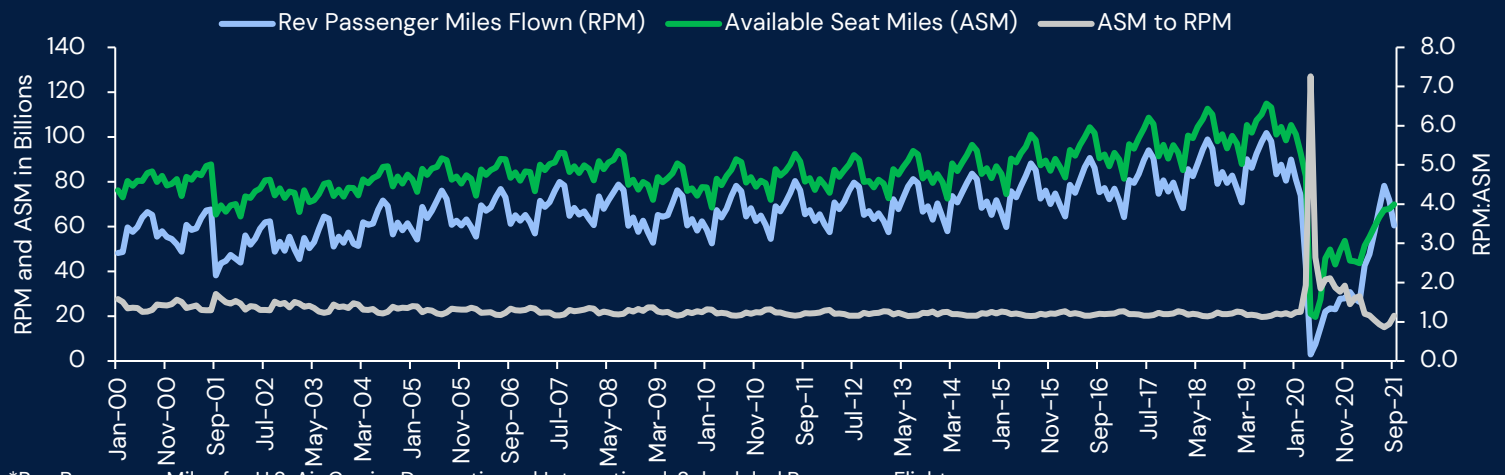
- **Removal of international travel restrictions, testing, and quarantine requirements.**
- **Leisure travel ticket prices, used to drive demand in price sensitive market, face rising costs.**
- **Consumer comfort and habit versus desire to catch up on long overdue travel.**

## Air Travel's Long Trip Back

### 2021 Passenger Traffic Still Less Than Half of Pre-Pandemic Levels

- Although airline global retail passenger miles rose 18% in 2021, they were still only 42% of pre-pandemic levels.
- Pick up was seen in domestic travel returning to 72% of 2019 levels, while international continued to suffer from travel restrictions and remained at 2020 lows (down 75%).
- North America showed a strong return, but even here 2021 travel remained less than half 2019 levels. By December 2021 U.S. domestic travel was down only 13% compared to the same month in 2019.
- Load factors also suffered with global rates of 67% versus 84% prior to the pandemic: simply put, flights were two-thirds full on average.

**By December 2021, U.S. domestic travel was down only 13% versus 2019**

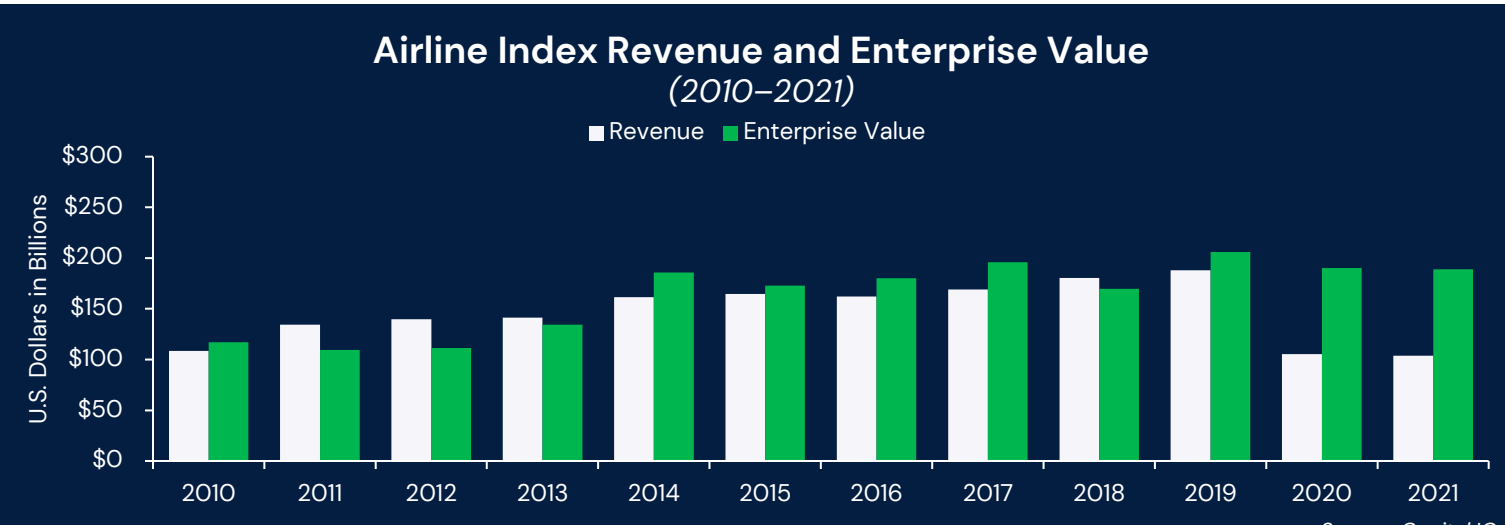



*Rev Passenger Miles for U.S. Air Carrier Domestic and International, Scheduled Passenger Flights
**Available Seat Miles for U.S. Air Carrier Domestic and International, Scheduled Passenger Flights

*Source: U.S. Bureau of Transportation Statistics*

## Public Markets Anticipate Airline Recovery Despite Financial Performance

Public equity markets have continued to look through to a recovery with Enterprise Value for our US Commercial Airline Index broadly in line with 2020 levels declining only 8% compared with 2019. This contrasts sharply with revenue 45% lower and demonstrates effects of government airline support.




*Source: Capital IQ*

## Air Travel Increases Through 2021

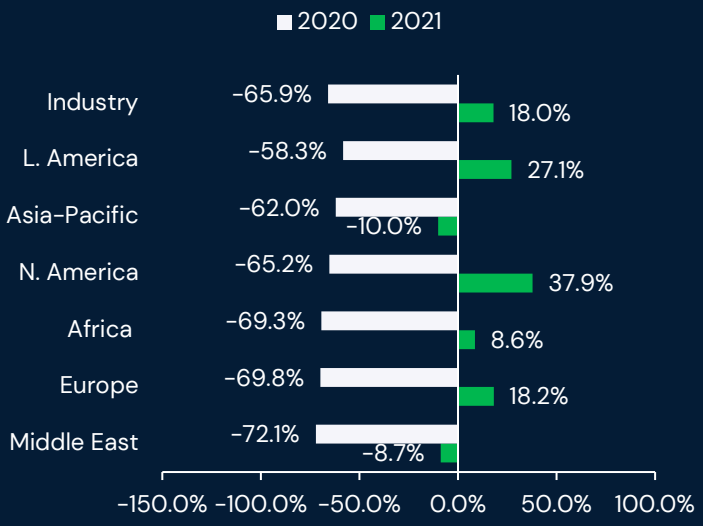
Despite disruptions from the Delta and Omicron variants, air travel continued to recover through 2021 with global air passenger volumes (RPK) rising to 42% of 2019 levels compared with 34% in 2020. Given less stringent travel rules, domestic markets recovered at a faster pace than international. That said, domestic travel routes remained volatile given significant sways in traffic in larger markets, notably China.

**2021 global airline passenger miles 42% of 2019 levels**

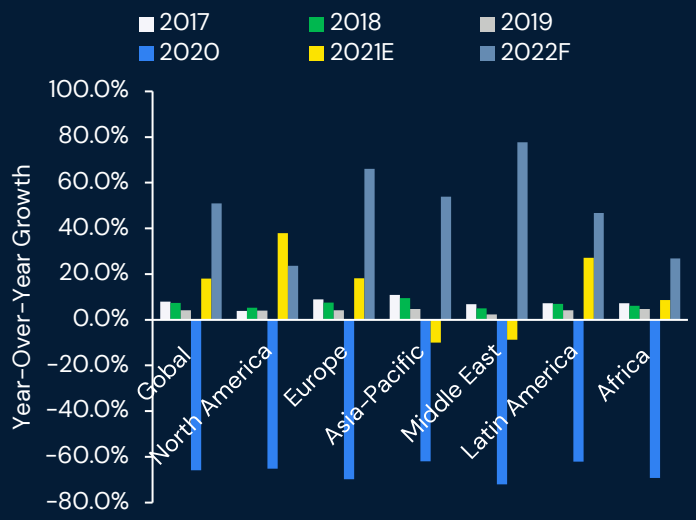
By the end of 2021, global RPKs were 45% lower than the same period in 2019, with domestic down 22% and international 58% lower.

Cirium expects global air traffic to reach 75% of 2019 levels by August 2022, with a full return to 2019 levels by August 2023 (absent impact of Ukraine events). Cirium reported fleet capacity at 20% below 2019 levels (as of March 2022), with U.S. single aisle capacity already back to 2019 levels, while global twin aisle capacity was down 25%.

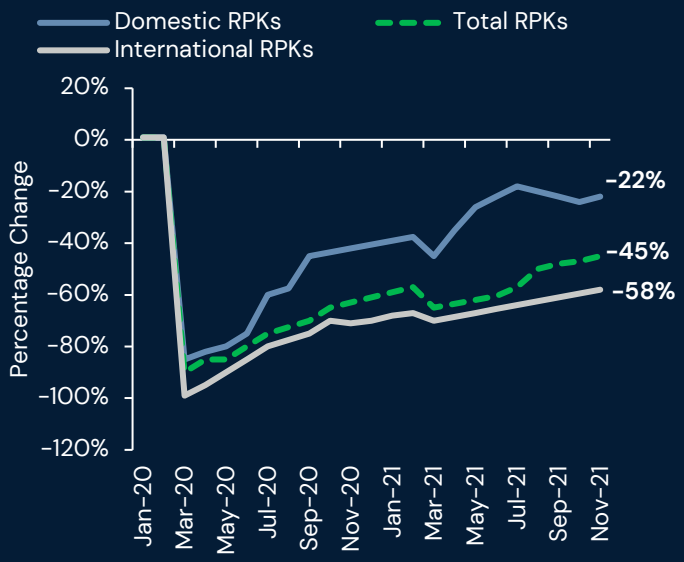
### Passenger Traffic Growth by Region




### Passenger Traffic Year-Over-Year Growth

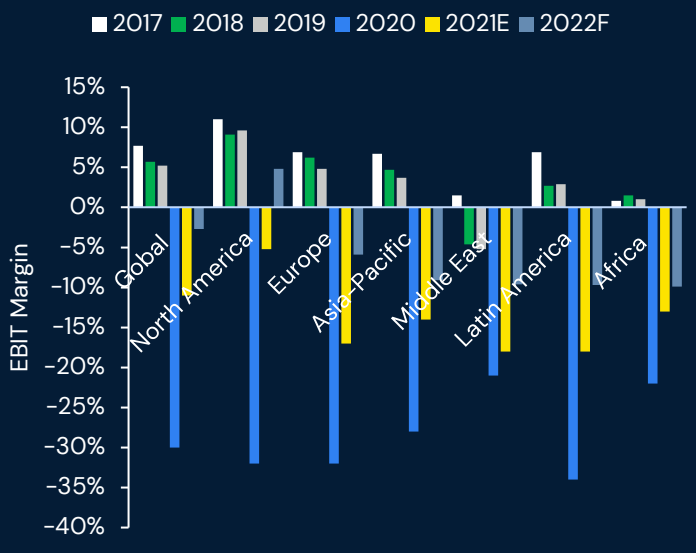



### RPKs, Percentage Change vs. 2019




*Source: International Air Transport Association*

### EBIT Margin by Region




*Source: International Air Transport Association*

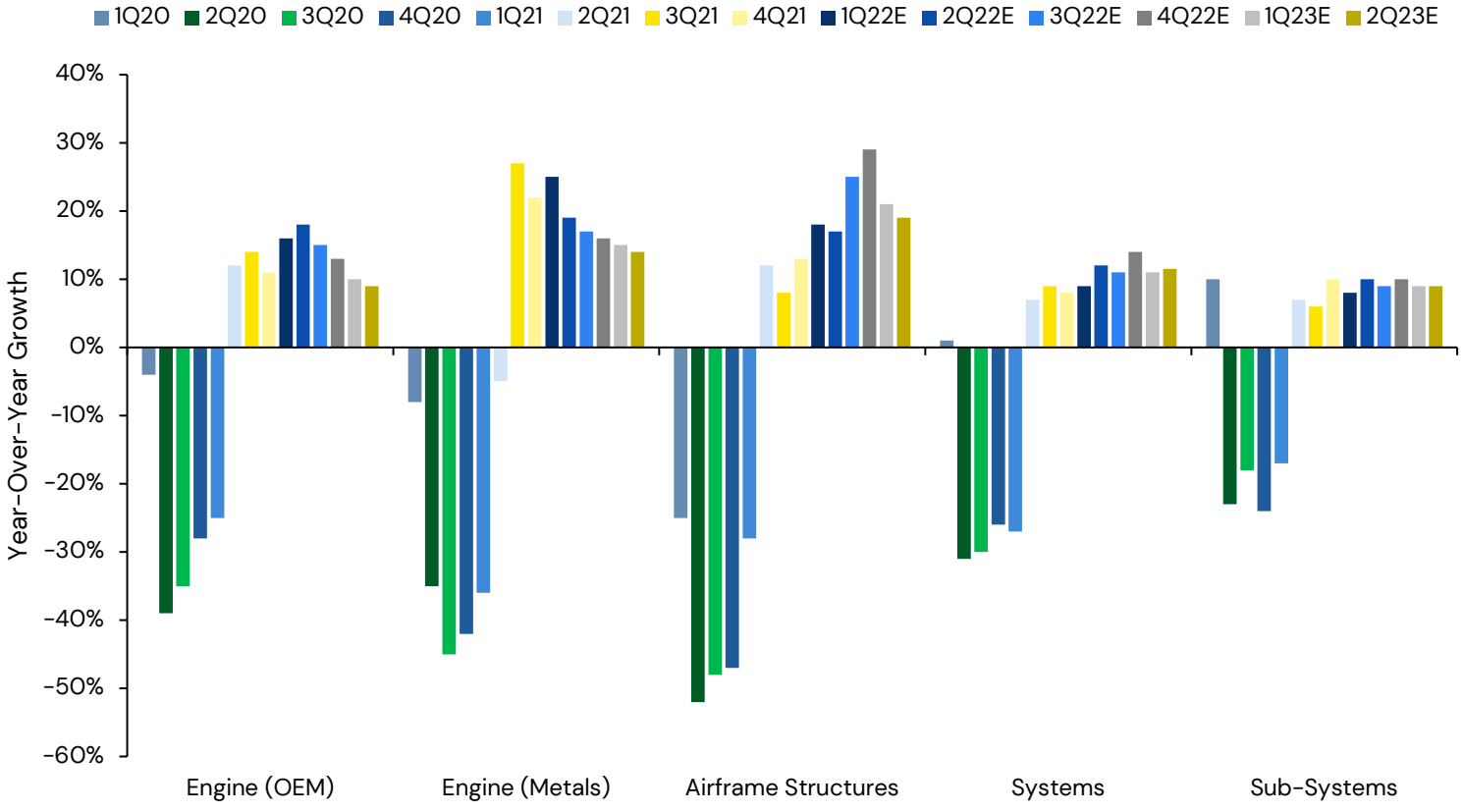
## Aerospace Suppliers Recovering But Face Headwinds

Based on company guidance and consensus estimates, a full recovery to pre-pandemic levels is expected in mid-2023. Heading into 2021, engine and airframe structure suppliers were already facing challenges, which was exacerbated by the escalation of the pandemic in the latter part of March 2021. While all categories of suppliers continued to post declines in Q1 2021, airframe structure, system, and sub-system manufacturers started to turn the corner in Q2 2021 while engine suppliers took slightly longer with signs of recovery in the second half of 2021.

**By mid-2023 a full recovery to pre-pandemic levels is expected by suppliers and commentators**

### Revenue Recovery Outlook

*(Year-Over-Year By Segment)*




*Source: Capital IQ*

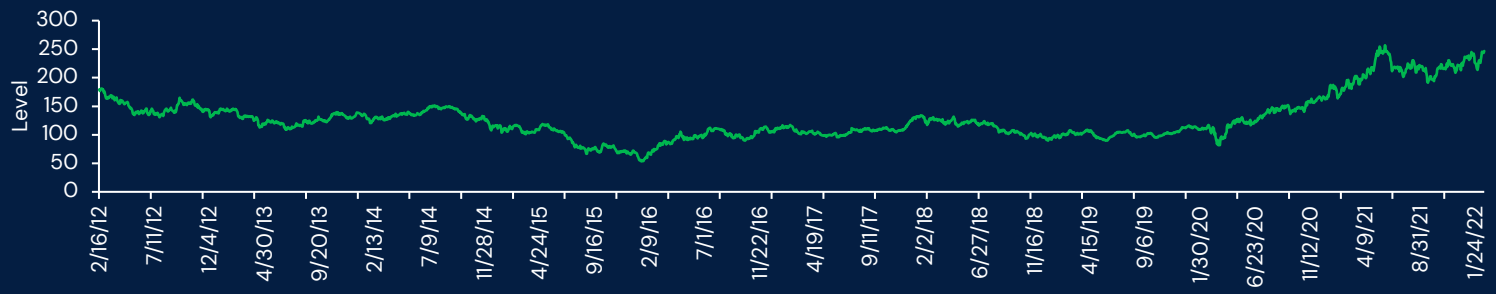
## Rising Costs Create Margin Pressures

Even with cost escalation clauses, there could be pressure on manufacturers' profitability as 75% of an airplane's cost base is prone to inflationary pressures, namely rising metal, fuel, and wage expenses, not all of which can necessarily be passed on to customers. These rising cost indicators underscore the risk for future margin compression. As of mid-February 2022:

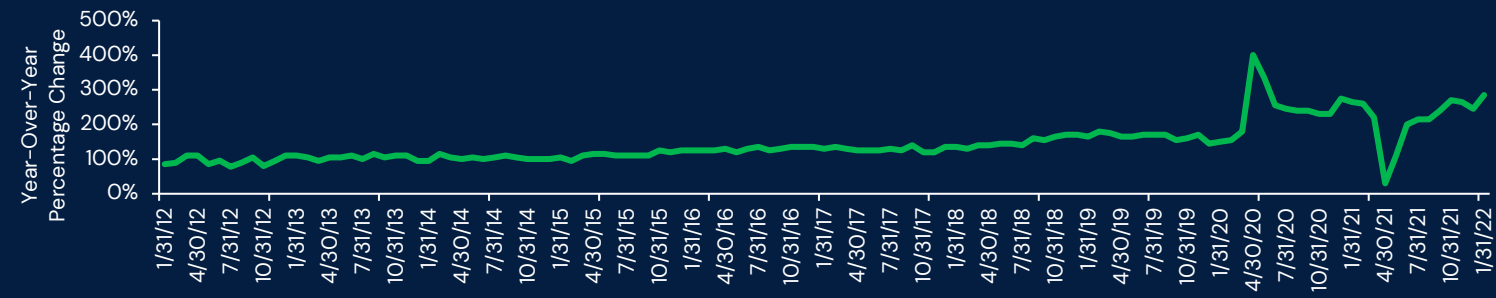
- Metal spot prices were 35% higher than last year and more than double 2020 and 2019 levels.
- Average hourly earnings increased over 30% year-over-year, 17% compared with 2020 and over 70% compared with 2019.
- Oil prices significantly increased, up 62% compared with 2021, up 75% versus 2020, and over 50% higher than in 2019.

**Average North American ticket prices in 2021 were 76% of 2019 levels, as airlines sought to stoke leisure demand in a price sensitive market. With increasing fuel and other costs, the strategy is likely to be more challenging in the coming year.**

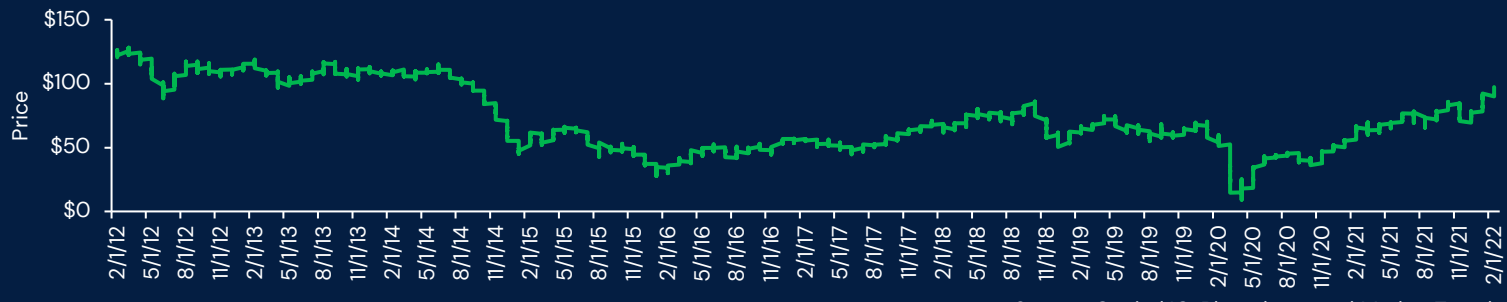
### Industrial Metals Spot Index




### U.S. Average Hourly Earnings Year-Over-Year Percentage Change




### Brent Crude Oil Price Per Barrel

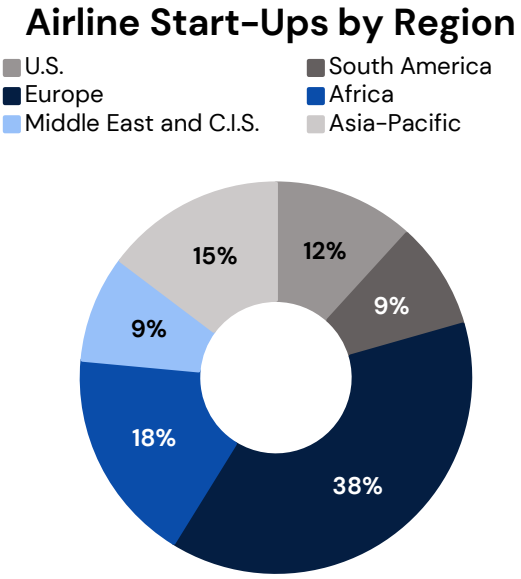



*Source: Capital IQ, Bloomberg, and Market Trends*

## Airline Start-Ups

Pandemic-induced global grounding of aircraft created favorable conditions for new entrants in the Airline industry. There were over 30 new airline start-ups in 2021 with almost 40% of those start-ups being in Europe, according to Simple Flying.[1]

New entrants have capitalized both on filling empty routes and on favorable asset and lease aircraft values. IBA anticipates the pick-up in new airline startups to continue into 2022, with Europe leading the way, followed by the Americas (21%), Africa (17%), Asia (15%), and the Middle East and C.I.S. (9%).




*Source: Simple Flying*

## Airline Bankruptcies

In 2021, there were an estimated 18 airline operators that ceased or suspended operations on the heels of 40 bankruptcies in 2020, 46 in 2019, and 56 in 2018. Of the 18 bankruptcies in 2021, none were in the United States and were, at least partly, due to the $54 billion bailout that covered payroll costs for 1.5 years as well as a $25 billion low-cost loan program extended to carriers. IBA forecasts that 20 airlines worldwide covering 200 aircraft will fail in 2022 with headwinds of higher fuel prices and other costs.

The most notable bankruptcy in 2021 was Alitalia, Italy's 74-year-old carrier, which made its final flights in October 2021. The airline will be replaced by a new national carrier, ITA (Italia Trasporto Aereo). The EU's executive commission has green lit a $1.6 billion injection of government funding to the new airline, but ITA plans to hire only around a quarter of the estimated 10,000 Alitalia employees.

## Russia Sanctions

It seems callous to view the horrors of events in Ukraine through the lens of the economic impact of sanctions on western companies, nonetheless, they are worthy of consideration.

**Lessors**: Aircraft with a value of around $10 billion are in Russia, owned by foreign leasing companies primarily European, Asian & U.S., and leased to Russian firms. While they make up around 4-5% of AerCap, BOC and Avolon's fleet value, the impact of a total loss in value of aircraft which cannot be repossessed is substantial, albeit perhaps not life threatening. By way of context, AerCap's 152 planes leased to Russian airlines have an estimated $2.5 billion value, relative to AerCap's $12 billion market cap and $10 million equity/book value. Lessors will argue risk of total loss rests with insurance companies, although where such liability ultimately lands between lessors, insurers, and bondholders is likely open to discussion.

**Orders:** With respect to sales of aircraft and parts themselves, the impact is likely manageable, since Russia only accounts for around 2% of Global GDP, 3% of the leased fleet, and 4% of pre-pandemic global passenger traffic. Russian orders comprise around 200 aircraft of Boeing and Airbus backlog (1.8%), with 75 planes to be delivered within two years (4% of depressed 2021 production).

**Supply Chain**: Russia accounts for around a third of Boeing Titanium purchases and nearer half at Airbus. While Boeing reports supply is not a problem in the short-term having significant stocks on hand, it is seeking alternates and a handful of western suppliers have presses large enough to replace forgings supplied by Russian state owned VSMPO. Engine makers have lower stocks, but purchase considerably less titanium from Russia. China is the largest supplier of Titanium sponge (the intermediate material) at 57% followed by Japan 17% and Russia 13%. Russia does not itself have large ore deposits, which are found in China, Australia, South Africa, and India.

**Airlines:** Increased fuel prices are likely to have the largest impact on airlines, since fuel often accounts for a third of an aircraft's operating costs. To the extent higher fuel costs feed through to reduced consumer demand and higher ticket prices, it is likely to slow the return to pre pandemic traffic levels. Flights to Asia Pacific from Europe and eastern U.S. are also impacted, generally adding two hours (and up to four hours) additional flight time (plus associated fuel consumption and weight) to avoid Russian airspace.

***Sanctions impact lessors, production, supply chains, and airlines.***

## MRO Continues to Suffer; Cargo Conversions Provide Rare Bright Spot; Increasing Pressure to Get Planes Back in the Air

MRO continued to suffer in 2021, with providers at around 75% of pre-pandemic 2019 revenue and 60% of operating profit.

- Average revenue of the top six MRO providers picked up slightly in 2021, by around 3% after 27% declines in 2020.
- Profitability improved with the sector generally returning to positive operating profit having suffered losses in 2020.

Providers responded, with Lufthansa Technik for example, restructuring to cut operating costs 28% in 2020 and a further 8% in 2021.

With revenue drivers a function of flight hours and fleet age, it is not surprising MRO suffered similar COVID woes as the airlines they serve.

- Flight hours have been significantly impacted with a sizeable portion of the fleet parked. Global passenger seat capacity in 2021 was 51% of 2019 levels as reported by IATA.
- Younger, more fuel-efficient aircraft with lower maintenance requirements and greater warranty coverage comprise a larger portion of the active fleet, with older aircraft parked. Prior to the downturn, MRO benefitted from MAX disruption as airlines used older aircraft with higher maintenance requirements in place of new undelivered MAX planes.
- There was a reduced demand for manufactured aftermarket parts as older aircraft were retired, parts were borrowed from parked aircraft, and salvaged spare parts became cheaper as values fell. This follows something of a bubble in the trading of aftermarket parts prior to the pandemic.

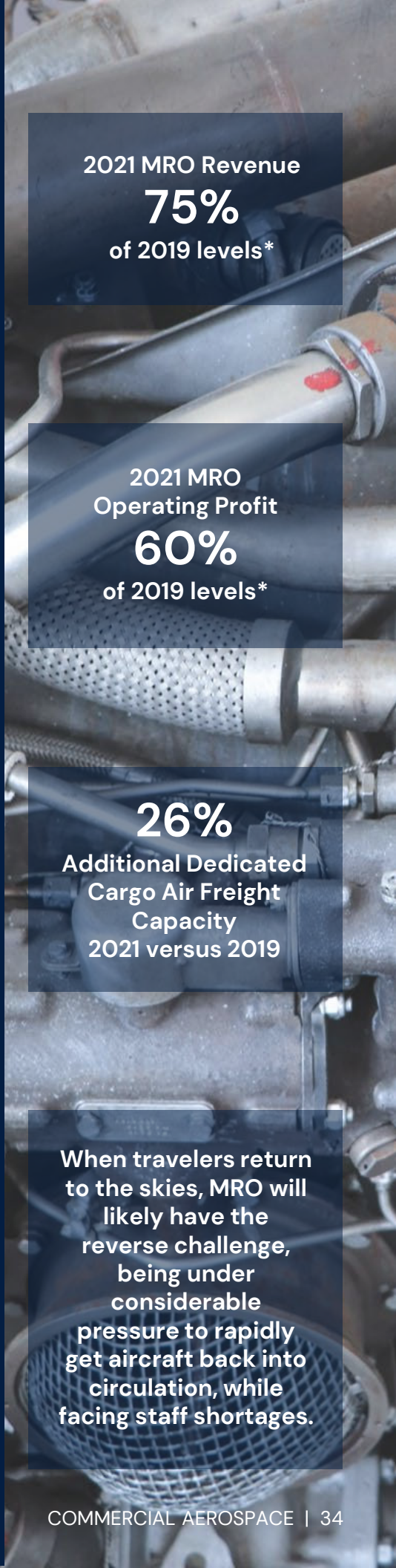
Nonetheless, proprietary aftermarket aircraft parts producers continue to be highly attractive acquisition targets, not only to traditional acquirers, but also to companies who previously were considered distributors and are seeking to increase their value add, profitability, and importance to customers.

One of the few bright spots was provided by cargo conversions, as cargo freight increased and demand for air cargo expanded following: greater eCommerce, pandemic induced goods purchases and disruptions in shipping and covid related supply chain challenges. The situation was exacerbated by large capacity reductions from fewer international passenger flights carrying cargo in the bellyhold, thereby creating demand for Cargo only aircraft. According to IATA:

- There was 26% more dedicated air freighter capacity in 2021 versus 2019 (from conversions and deliveries).
- Air cargo volumes grew 19% in 2021 (almost double the 10% increase in world goods trade) to 3.5% above pre-pandemic peak.
- Freight capacity in the bellyhold of passenger aircraft in 2021 was 39% below 2019 peak (and can be expected to return when international travel resumes following a relaxation of travel rules).

When leisure travelers return to the skies, eager to catch up on lost vacations and overdue reunions with family and friends, MRO will likely have the reverse challenge being under considerable pressure to rapidly get aircraft back into circulation, while facing staff shortages following the layoffs needed to survive the long intervening period.

**Median from divisions of six largest MROs. Uses latest financial info available rather than 12 calendar months.*



**2021 MRO Revenue**
**75%**
**of 2019 levels***

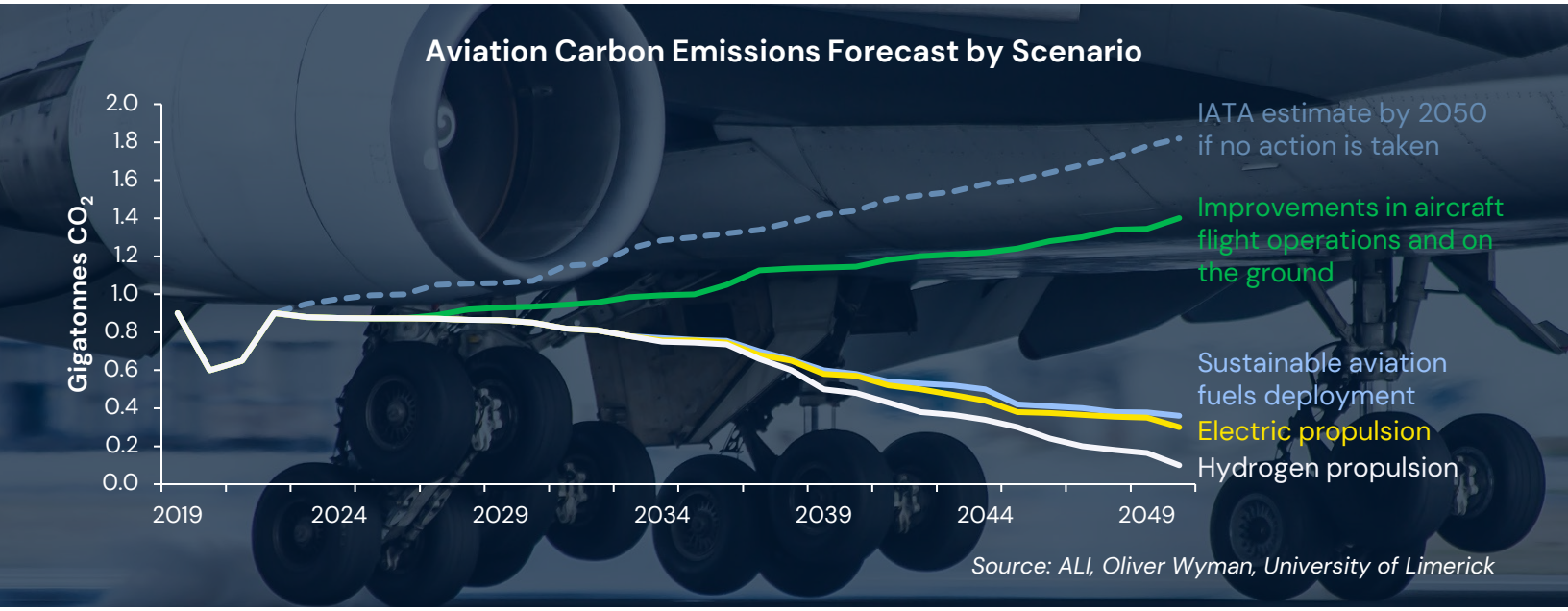
**2021 MRO Operating Profit**
**60%**
**of 2019 levels***

**26%**
**Additional Dedicated Cargo Air Freight Capacity 2021 versus 2019**

**When travelers return to the skies, MRO will likely have the reverse challenge, being under considerable pressure to rapidly get aircraft back into circulation, while facing staff shortages.**

## Sustainability Gains Awareness in Commercial Aerospace

Aviation currently accounts for around 2.3% of global greenhouse gas emissions, and that share is expected to rise over the next decade as passenger demand for air travel grows. Improvements in aircraft design and operational efficiency continue, but alone are not expected to be sufficient to reach carbon net-zero by 2050, according to a study by Oliver Wyman.[2] Emerging technologies such as sustainable aviation fuels (SAFs) are beyond the pilot stage, but step changes such as electric and hydrogen propulsion are a long way from commercialization.




The "Toulouse Declaration" of February 2022 was a public-private European aviation initiative building on "Destination 2050" from a year earlier that detailed a route to reaching net zero $CO_2$ emissions and was associated with European government airline pandemic support including:

- Improvements in aircraft and engine technologies to achieve emission reductions of 37%.
- Using sustainable aviation fuels that could achieve emission reductions of 34%.
- Advances in hydrogen power technology that could achieve emissions reductions of 20%.
- Implementing economic measures to achieve emission reductions of 8%.
- Improvements in ATM and aircraft operations targeting emission reductions of 6%.

Greater use of carbon offset arrangements and renewable electric alternatives are also being pursued, particularly in General Aviation, both on the ground at FBOs and innovations sought in powered flight.

**Improvements in aircraft design and operational efficiency alone, are not expected to be sufficient to reach carbon net-zero by 2050**

Airbus points to progress which has been made, with a >50% reduction in $CO_2$ emissions per RPK in the 30 years since 1990 (-2.6% CAGR) from more fuel-efficient aircraft with improved aerodynamics, advanced materials, and fuel-efficient engines; as well as operating benefits from greater utilization, load factors, and more seats per flight. Going forward, Airbus highlighted improvements from the adoption of more fuel-efficient aircraft: as of 2019 only 13% of the operating fleet were new generation aircraft, which through retirements and growth are expected to comprise more than half the fleet by 2030.

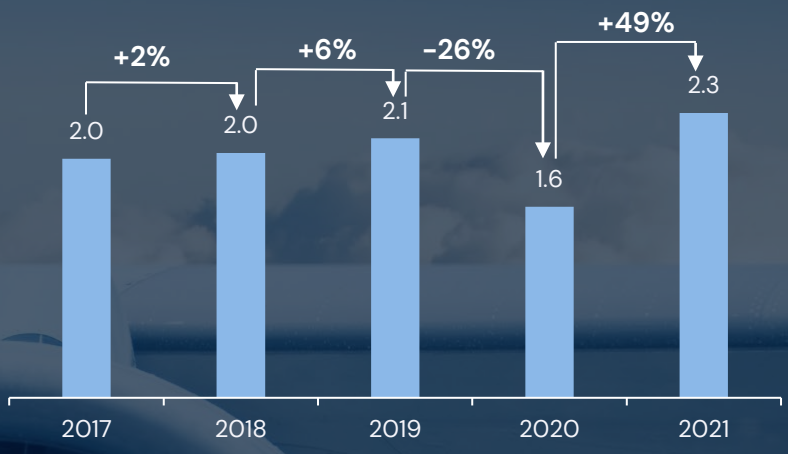
GE also points to past progress, with today's aircraft engines consuming 40% less fuel and emitting 40% less $CO_2$ than those manufactured in the 70s & 80s, and new generation engines having 10% efficiency improvements over their predecessors due to improved architecture, aerodynamics and materials. Looking to the future they highlight new technologies being worked on, with open fan architecture CFM RISE advanced thermal management engines to enter service by mid 2030s, offering 20% improvements in efficiency and emissions over today's new engines, and 100% compatibility with alternative energy sources such as SAFs and liquid hydrogen. Open fan tests in the 1980s demonstrated fuel savings >30%. Alternative propulsion concepts being explored include hybrid and electric, as well as using liquid hydrogen (stored <-253°C) as aviation fuel.

## Business Jet Flights Reach New Heights

Global business jet flights, marked the highest on record in 2021, being 7% above the previous 2019 record. During the holiday season 2021 (Dec. 20 – Jan. 2), there was a 41% increase compared to the same period in 2019.

The U.S. led business jet growth, increasing 10% versus 2019 and was fueled by fractional and branded charter operations, which were up 20% and 18% respectively, compared with two years ago. Private and corporate flight growth was more muted but still surpassed 2019 levels, totaling 3.3 million in 2021.

**Business Jet Departures in the U.S.**
(2017–2021, in millions)




*Source: WingX*

## Private and Business Jet Services Expect Continued Momentum

Argus TraqPak anticipated that 2022 will be another record year for private jet flights in North America, and estimated flights will increase almost 10% compared with 2021. Growth can largely be attributed to:

- New clients introduced to private flight during the pandemic: this drove demand to record levels, particularly among leisure travelers. Once customers have a taste for private travel, it is expected they will be reluctant to return to commercial airlines and airports.
- Expanding service options has created demand: greater availability and visibility of private-jet charter services, as well as jet cards and fractional ownership, have made private travel more accessible.
- Rapidly expanding wealth and low penetration: there was a 23% increase in the number of people with net worth >$50m in North America in 2020 alone. A 60% increase is expected in the five years to 2025. It is estimated that about 90% of people who can afford to fly privately still do not.
- Lower service levels in commercial aerospace: airline services have been constrained by insufficient aircraft availability amid rising demand, fewer direct routes, reduced frequency of service, and weakening service levels.

## Fragmented Market Ripe For Consolidation

Private aviation is highly fragmented with over 1,900 registered Part 135 operators in the U.S. Adjacent markets, such as FBOs and air ambulance, provide a model for national consolidation. Many jet card players follow asset light business models and are flight hour supply constrained in the face of this increased demand.

2021 saw a particular increase in private aviation and business jet services related transactions, with general aviation comprising almost 20% of our Support Services & MRO subsector M&A. Notable transactions include:

- Following last year's $4.5 billion acquisition of private jet terminals provider, Atlantic Aviation, and subsequent expansion via a merger with FBO group, Ross Aviation, KKR invested $190 million in private aviation company, Jet Edge, in June 2021. In January 2022, KKR announced an additional $75 million investment in Jet Edge to onboard a further 20 super mid and large-cabin aircraft. In March this was followed by the announced sale of Jet Edge to Vista Global Holdings/ XOJET.
- Wheels Up (NYSE:UP) made its market debut in 2021 via SPAC valued at an enterprise value of $2.1 billion. Since the SPAC merger in July, Wheels Up acquired two private aircraft charter companies in 2022 including UK-based Air Partner (LSE:AIR) in April for $100 million, or 12.1x LTM EBITDA (7.0x NTM EBITDA), and Scottsdale-based private charter company, Alante Air Charter in February for $14.6 million.
- In May 2021, Blade Urban Air Mobility (Nasdaq:BLDE) completed its $365 million combination with a special purpose acquisition company to enable acceleration of its acquisition and route expansion strategy. Blade made two subsequent acquisitions including Trinity Air Medical (asset-light organ logistics company) in September for $23 million, and Helijet (helicopter airline) in December for $12 million.

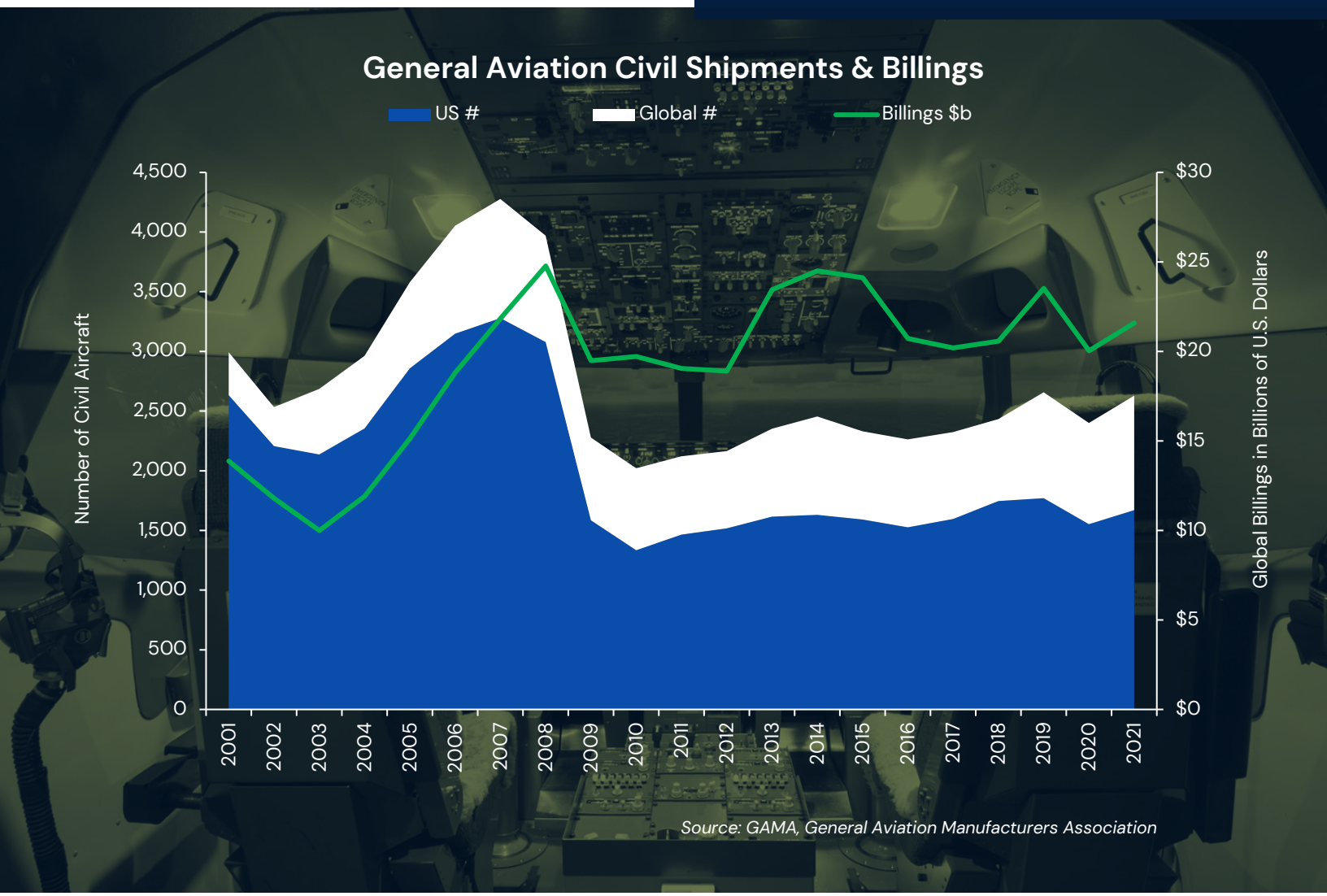
## General Aviation Increased Production

General aviation billings grew 10% in 2021 to $25 billion, but were 10% below 2019 levels, as reported by GAMA.[3]

Growth in shipments was seen across all segments in 2021, although many remained below 2019 levels:

- Business jet shipments were up 10% over 2020, but were 88% of 2019 shipments. Most business jet OEMs reported growth in 2021 and book-to-bill increases for nearly all were well above 1.1 and pushed up backlogs.
- Turboprop airplane shipments were up 19% over 2020 and in line with 2019 levels.
- Piston airplane shipments in 2021 were up 6% and 1% above 2019.
- Helicopter shipments rose 25% over 2020 levels and were 98% of 2019.

**General Aviation billings increased 10% in 2021, but were 10% below 2019 levels**



## Aircraft Lessors Now Own More Than Half of Commercial Fleet

Aircraft leasing's ability to continue to access capital has secured its ongoing expansion. Over the past 20 years, while the global fleet has doubled, the leased fleet has quadrupled. With airlines in need of cash, they turned to leasing partners to not only renegotiate the terms of their existing contracts, but also to purchase owned aircraft and lease them back. Heading into 2020, lessors managed slightly more than 48% of the 22,000 passenger jets operated by airlines or stored globally, according to Cirium.[4] Since then, leasing penetration has surpassed the 50% mark, driven by both lessors financing almost 65% of new deliveries and via purchase and lease back acquisitions of lightly used aircraft.

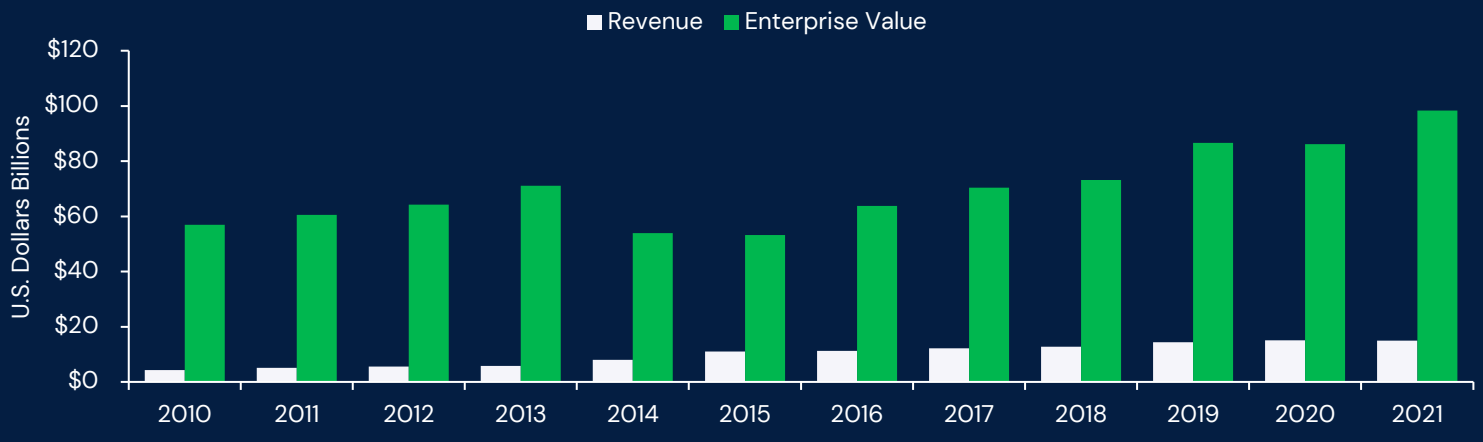
Trends in 2021 included:

- Pressure on lease rates – some of the new leases are aircraft returning to previous operators on restructured terms. Current Market Lease Rate (CMLR) reductions are averaging around 30% for older single-aisle aircraft while newer generation aircraft (i.e. A320neo and 737 MAX family) lease rates have been under less pressure with reductions averaging around 10%. 2021 appears to have marked the bottom and CMLR rates are expected to improve in 2022.

- Narrow body dominance - demand for widebodies from lessors is expected to be minimal as lessors focus on lower risk profiles and higher returns from short-haul narrow bodies. This exacerbates already low demand for widebodies given slower recovery of international long-haul markets.

**Aircraft Lessor Revenue and Enterprise Value**

*(U.S. Dollars in Billions)*




*Source: Capital IQ*

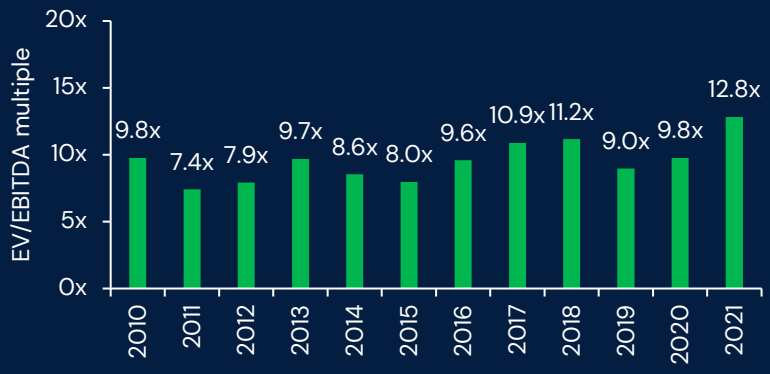
## Leasing Financial Support

Lessors' earnings have held up far better than may have been expected, despite falling aircraft values and concessions to airlines.

Similarly, public leasing company market values have remained strong with high multiples.

Consequently, lessors have still been able to access new capital at low cost, not only ensuring their survival, but enabling them to increase share as airlines look to them as a source of financing.

**Aircraft Lessor Median EV/EBITDA Multiple**




*Source: Capital IQ*

## Aircraft Leasing M&A

In Q4 2021, AerCap (NYSE:AER) completed the acquisition of the largest player, GECAS, securing its leadership being more than three times the size of the next largest competitor. The $31 billon transaction from General Electric (77% cash and 23% stock) was valued at a slight discounted to its $34 billion of net asset value.

As a further sign of sector support, Carlyle completed its previously announced acquisition of publicly traded Fly Leasing (84 aircraft leased to 37 airlines) in August at 0.7x book value and 15x EBIT, in a proposed $0.5 billion equity and $2.4 billion enterprise value transaction.

### Top Aircraft Leasing Companies

| Rank | Name | Fleet Size* | On Order | HQ | Ownership |
|---|---|---|---|---|---|
| 1 | AerCap | 1,957 | 436 | Ireland | Public, AER (Ireland) |
| 2 | Avolon | 596 | 226 | Ireland | Bohai Financial (China) |
| 3 | SMBC | 528 | 199 | Ireland | Sumitomo Mitsui (Japan) |
| 4 | Nordic Aviation | 480 | 64 | Denmark | EQT (Sweden) |
| 5 | Air Lease Corp. | 474 | 304 | USA | Public, AL (USA) |
| 6 | ICBC Leasing | 457 | 95 | China | Industrial & Commercial Bank of China |
| 7 | BBAM | 444 | NA | USA | GIC (Singapore) |
| 8 | BOC Aviation | 417 | 109 | Singapore | Public, Bank of China (China) |
| 9 | AWAS DAE | 377 | 10 | Ireland | Dubai Aerospace Enterprise |
| 10 | Aviation Capital | 348 | 47 | USA | Century Tokyo Leasing (Japan) |

*Fleet size by number of owned & managed aircraft
*Source: Aviation Week Network Fleet Discovery, CAPA*

### 2021 Deliveries to Lessors

| | Airbus | | | | | Boeing | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Lessor** | **A320neo** | **A321neo** | **A330-900** | **A350-900** | **A350-1000** | **737 MAX** | **777F** | **787-9** | **777-300ER** | |
| Air Lease Corp. | 4 | 21 | 2 | 1 | 3 | 16 | 0 | 3 | 0 | 50 |
| Aviation Capital | 21 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| SMBC | 8 | 9 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 32 |
| Aercap | 12 | 12 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 27 |
| BOC Aviation | 6 | 10 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 21 |
| ICBC Leasing | 8 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 16 |
| Avolon | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| BOCOMM | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| China Aircraft Leasing | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| CDB Leasing | 1 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 7 |
| CMB Financial Lease | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| DAE Capital | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 |
| Alafco | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| Novus Aviation | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| **Total** | **100** | **65** | **4** | **1** | **3** | **55** | **0** | **3** | **2** | **233** |

*Source: Boeing and Airbus*

# DEFENSE OUTLOOK

## 4 RENEWED FOCUS ON INCREASING DEFENSE SPENDING

***"Department of Defense needs resources matched to strategy, strategy matched to policy, and policy matched to the will of the American people"***

*- Secretary of Defense, Lloyd Austin[5]*

### Russian Invasion of Ukraine Renews Focus on Increasing Defense Spending

Nearly halfway into the federal fiscal year, President Biden signed a $1.5 trillion omnibus spending package—the Consolidated Appropriations Act (CAA)—on March 15, 2022[6], following the three Continuing Resolutions (CRs) designed to keep the government operating until Congress could agree on a final budget. Discretionary spending levels are no longer subject to caps, as they were for the 10 years between FY 2012 and FY 2021. The CAA 2022 contains $730 billion in non-defense spending, a 6.7% increase over FY 2021 appropriations, and $782.5 billion in national security spending, a 5.6% jump from the previous fiscal year. Of note, the defense funding for FY 2022 eliminates the Overseas Contingency Operations (OCO) budget loophole, which allowed for wartime expenditures above the base budget.[7]

Looking back a year, President Biden's Interim National Security Strategic Guidance ("Interim Guidance"), released on March 3, 2021, provided strategic direction to the Department of Defense (DoD). China was identified as the greatest long-term challenge to the U.S., a "pacing threat," and thus the continued investments in artificial intelligence, hypersonic technology, cyber, and quantum computing.[8]

However, in direct response to the Russian invasion of Ukraine, the budget legislation included a separate amount of $13.6 billion in emergency spending in humanitarian and military aid for Ukraine[9], broken down by:

- $6.9 billion in traditional foreign aid (e.g., food, refugee assistance);
- $3.5 billion in military supplies (e.g., anti-aircraft and anti-armor systems; tactical unmanned aerial systems or drones)[10];
- $3 billion in U.S. deployments and intelligence programs; and
- $175.5 million for enforcing sanctions.

This total represents 10 times greater than the amount given to Ukraine in fiscal year 2020, the last year of published government data.[11] Should the war in Ukraine require additional U.S. support in the region, Pentagon Comptroller McCord already indicated that supplemental funding could be requested.[12] On March 28th, President Biden released his FY 2023 requested budget, with a topline budget for national security spending of $813 billion up 4%, which includes the Defense Department, defense-related spending from the Department of Homeland Security and Department of Energy funds associated with nuclear weapons. $773 billion is for the U.S. military, representing an increase of $69 billion or 9.8% over the Defense Department enacted budget for FY 2022.[13]

***March 2022 Consolidated Appropriates Act provides $782.5 billion in defense spending, a 5.6% increase.***

*Image source: Office of the Under Secretary of Defense (Comptroller)/Chief Financial Officer, "May 2021: Defense Budget Overview."*

Description: A Ukrainian soldier fires a U.S.-made Javelin missiles during a training exercise in January 2022. The Ukrainians have used the Javelins to repeatedly take out Russian tanks and other armored vehicle

Description: Pallets of ammunition, weapons and other equipment bound for Ukraine are secured onto a plane during a foreign military sales mission at Dover Air Force Base, Delaware, Feb. 28, 2022.
Source: U.S. Air Force, 436th Airlift Wing, Public Affairs

**Highlights of the Department of Defense Fiscal Year 2022 Appropriations Budget include[14]:**

- Increase in the research and development accounts, allocating $119 billion in Research, Development, Test and Evaluation (RDT&E) funding, up $7 billion from the department's request and $12 billion above the FY21 enacted.
- It also allocates about $145 billion for Procurement, $12.4 billion above the budget request and $8.4 billion above the last year's appropriation.
- Navy was appropriated $26.7 billion to buy 13 new ships, $4.1 billion above the request.[15]
- The budget funds the Air Force's request for 85 F-35s, 12 F/A-18E/Fs and 12 F-15EXs.
- The Army procurement account includes $139 million above the Army request for 41 additional Stryker A1 combat vehicles. Congress added $374 million above the Army's budget request for counter-small Unmanned Aerial Systems, bringing that total to $434 million.

## NATO Allies Step Up

From the outset of the conflict, NATO issued a stern condemnation of the Russian invasion of Ukraine citing a clear violation of international law.[11] Apart from the political rallying effect the hostilities had on NATO's members, the notable change on the organization is the pledge to spend the required 2% of GDP towards defense—long known as burden sharing. One of the first to announce an increase in spending up to 2%, currently at 1.53%, is Germany, dovetailing its commitment also to halt its Nord Stream 2 gas pipeline project with Russia and to send defensive anti-tank weapons, surface-to-air missiles, and ammunition to Ukraine.[16]

Other European countries have stepped up their pledge to reach this defense spending goal, even if not a NATO member. For its part, neutral Sweden is seeking to boost its spending up from 1.3% to the 2% level, as a self-defense measure while simultaneously dampening speculation of joining NATO.[17] Denmark, a founding member of NATO, also made a commitment to reach the organization's target in just over a decade. Geographically closer to Russia, Romania, and Latvia pledged to step up defense spending to 2.5%, with Poland committing to a 3% of GDP goal.[14] By contrast, over the course of the last 45 years the U.S. defense budget ranged from a minimum of 2.9% of U.S. GDP to a maximum of 6.8% in 1983, with an average of 4.3%, according one *Wall Street Journal* report.[18]

***NATO Allies are now facing up to the burden of the sharing pledge, to spend 2% of GDP towards defense. Germany, as the fourth largest economy with a commitment to increase from 1.5%, offers meaningful additional defense expenditure***

## Growing Reliance and Infrastructure Build-Out of Space

Whether commercial electro-optical imagery of Ukraine,[19] or setting government goals for cislunar orbit,[20] there is no doubt that the growth of space as a warfighting domain will continue. With nearly across the board spending increases in the space budget—from command and control, launch, PNT (positioning, navigation, and timing), space control and JADC2 (Joint All Domain Command and Control) — space continues to form an integral part of the U.S. military and commercial infrastructure backbone.[21]

In its third year of existence, the U.S. Space Force continues it trajectory of ambitious goals by capitalizing on commercial technology and services. Chief among its strategic objectives is to create a "transport layer" to provide the military with assured, resilient, low-latency data and connectivity worldwide. To this end, Space Development Agency Director Derek Tournear noted the organization would launch its "Tranche 0" spacecraft within the year, underpinned by 28 satellites, 20 of which will go toward the data transport layer.[22]

As written in last year's Capstone Defense Sector report, one of the critical programs supported by Congress is a $550 million demonstration of missile-tracking satellites for the U.S. Indo-Pacific military command. This $550 million price tag for missile-tracking systems of sensor satellites, geared towards detecting and tracking Russian and Chinese hypersonic missiles, is considered a down payment to start the Tracking Layer Tranche 1. Tranche 1, based in Low Earth Orbit (LEO), is a constellation of 28 infrared sensor satellites that would cost about $2.5 billion to procure and launch.[20] Early design of the Tracking Layer were awarded to two commercial/defense contractors, with SpaceX securing $149 million and L3Harris $194 million to each build four satellites to detect ballistic, cruise and hypersonic missiles using a wide field of view IR sensor.[23] The new constellation will be part of the "National Defense Space Architecture," comprising satellites for tracking, positioning, navigation and timing and warfighter communications.[24]

In support of these and other goals, Congress boosted military space programs, by added nearly $1.3 billion for U.S. Space Force and Space Development Agency projects above what the Biden administration requested. The $1.3 billion Congress added for space technology, includes another Global Positioning System satellite, increases spending on small launch services and missile-detecting satellites.[25]

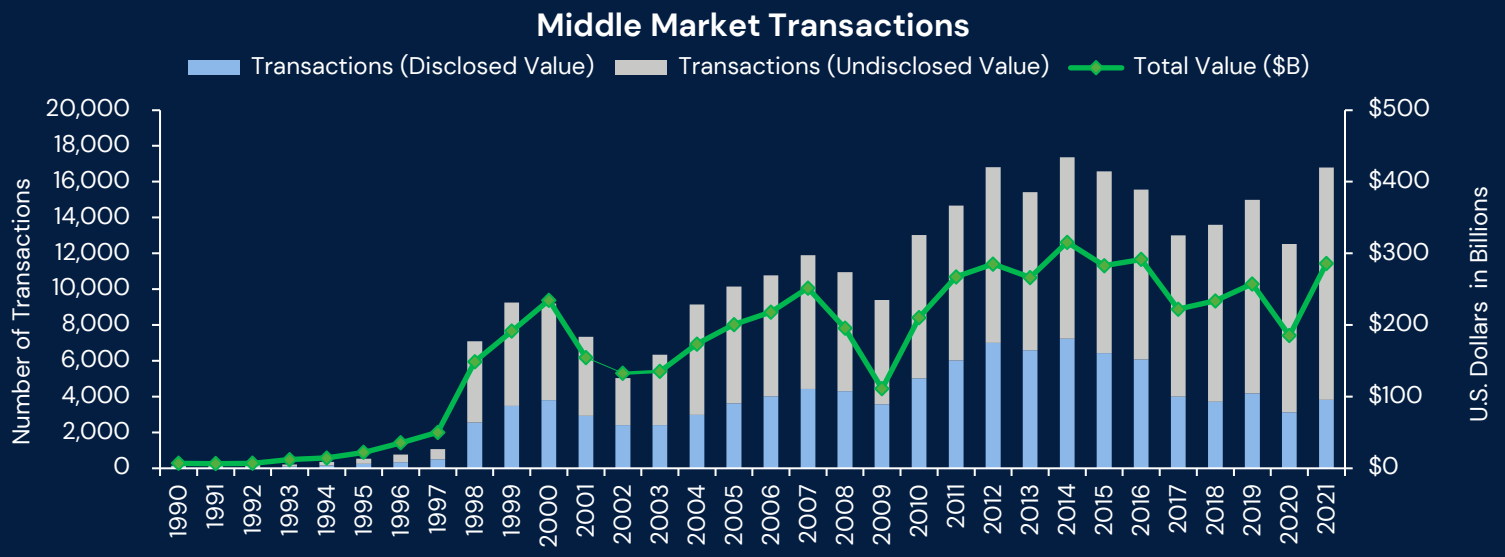
**2021 Interim National Strategic Guidance to DoD identified China as the greatest long-term challenge to the U.S., ensuring continued investments in new technologies.**

*Description: Rendering of missile tracking satellite developed by L3Harris for the Space Development Agency*
*Source: L3Harris*

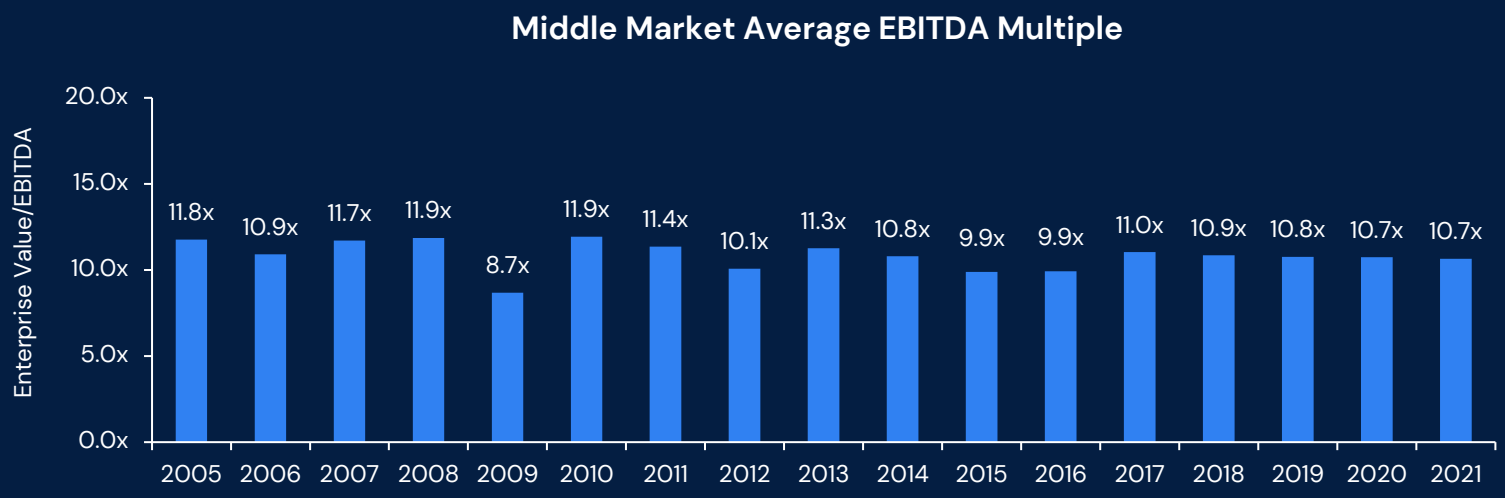
## Robust Defense Sector M&A Activity Continues

With this dynamic geopolitical-economic backdrop, we expect a robust Defense sector M&A market to continue into 2022, at the same or higher pace as 2021. As we noted in our Capstone Space Report in January: "*The focus on space for military, commercial, and civilian activity has catalyzed space start-ups and financing in the private sector, which will feed M&A opportunities as the nascent segment consolidates and defense primes and emerging players acquire new technology and personnel.*"[26]

Transaction volume, value, and multiples across the middle market hit historic highs as two years of deals that were delayed due the pandemic were rolled into 2021. Additionally, the perceived tax increases in 2022 have incentivized business owners to expedite their exit timelines in order to maximize the take-home proceeds of a liquidity event. These factors have contributed to a historic year in 2021, as total closed deals increased 34.1% year-over-year, marking the highest full-year transaction volume since 2014. As we look to 2022, deal volume is expected to remain robust as transactions that did not close in 2021 spill into the new year and new sellers go to market to capitalize on the dynamic environment. Abundant levels of private equity dry powder, cheap debt, and strong corporate cash holdings are helping to drive competitive deal processes for attractive businesses.




Average middle market EBITDA multiples in 2021 mirrored the prior year average at 10.7x, as the average valuation was dampened by an abundance of smaller deals under $100 million in enterprise value, which comprised nearly 54% of disclosed transactions.




*Note: includes multiples 3x-30x and enterprise value < $500 million*
*Source: Capital IQ and Capstone Research*

## Air, Land, Sea, & Space Transactions

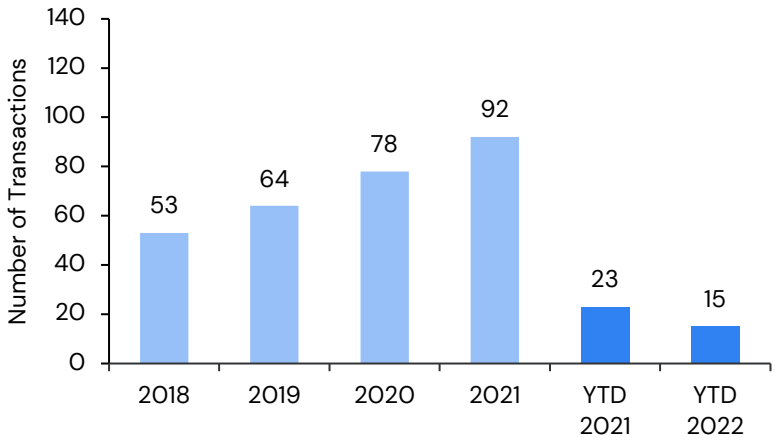
Transaction volume in the Air, Land, Sea, & Space (ALSS) sector has seen steady growth over the past three years—largely fueled by a rapid increase in Space transactions. Of the 92 deals, announced or closed in 2021, nearly half (42 transactions) were in the Space segment, displacing Air for the first time as the most active subsector.

Companies across the ADGS industry have historically earned premium transaction valuations in the middle market, with a three-year average multiple of 11.8x EV/EBITDA compared to an average of 10.7x across the entire middle market during the same period. Within the ALSS Systems sector, EV/Revenue transaction multiples have marginally eclipsed the broader ADGS industry at 2.5x compared to 2.1x—while EV/EBITDA multiples have kept pace.

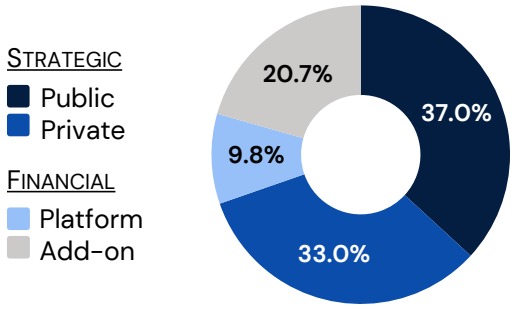
**Space has seen substantial expenditure, as a war fighting domain in addition to commercial activity, in turn fueling significant M&A as the nascent sector consolidates and defense primes and emerging players add new technologies and personnel.**

### Transaction Volume Remains Strong in Air, Land, Sea, & Space Sector

*(U.S., Canada, Europe)*




### Strategic Buyers Complete Seventy Percent of 2021 Activity




*Year-to-date (YTD) as of March 28, 2022*
*Source: Capital IQ, Pitchbook, FactSet and Capstone Research*

## Valuation Analysis

| Valuation Method | Average Enterprise Value/Revenue Multiple | Average Enterprise Value/EBITDA Multiple |
|---|---|---|
| Air, Land, Sea, & Space M&A Purchase Multiples *(U.S., Canada, Europe, 2018-March 2022)* | 2.5x | 11.6x |
| Public Company Land, Air, Sea, Space Trading Multiples *(Last-Twelve-Months)* | 2.7x | 14.4x |
| Aerospace, Defense, Government, & Security Middle Market M&A Purchase Multiples *(U.S. Canada, 2018-March 2022)* | 2.1x | 11.8x |

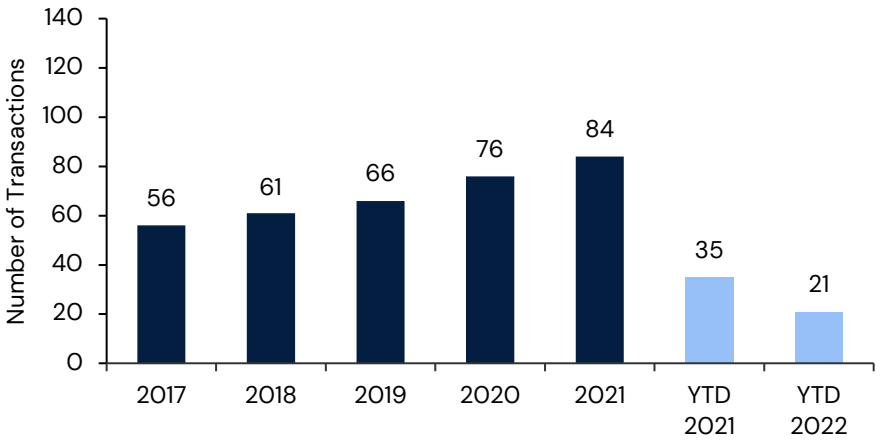
*Source: Capital IQ, FactSet, PitchBook, and Capstone Research as of March 28, 2022*

## C4ISR Transactions

C4ISR (Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance) transactions outperformed the previous year's deal high as the industry's stability, and constant need for mission-critical technology for gathering data and interoperable information sharing continue. This is in part driven by the Department of Defense's 2021 JADC2 initiative.

C4ISR volume climbed to a total of 84 transactions in 2021, marginally outpacing 2020 to reach the highest annual figure since Capstone began tracking the industry in 2012. Buyers have also showed a willingness to pay a premium for quality C4ISR companies, with the average 2021 deal multiple of 12.5x EV/EBITDA.

**C4ISR Deal Volume Continues Climb in 2021, Slower Start to 2022**




*Year-to-date (YTD) as of April 22, 2022*
*Source: Capital IQ, Pitchbook, FactSet and Capstone Research*

**The global C4ISR market is projected to see a compound annual growth rate (CAGR) of 4.6% to reach $161.4 billion by 2027, with North America claiming the highest revenue share, according to Emergen Research.[27] Within C4ISR, Defense Intelligence, including advanced communication, reconnaissance, and surveillance solutions, is forecasted to experience the fastest growth at 7.8% CAGR through 2027.**

## Notable Defense Sector Deals Include:

- Teledyne (NYSE:TDY) completed the acquisition of imaging systems business FLIR Systems in May for $8 billion. While the companies' business models are similar and their technologies are complementary with minimal overlap. The price tag represents 4.2x LTM revenue and 18.0x LTM EBITDA.
- In a take-private deal, Veritas and Evergreen Coast Capital acquired Cubic Corporation (NYSE:CUB) in May for an all-cash value of ~$3.0 billion including debt assumption, at 2.3x revenue and a robust 14.7x EV/EBITDA.
- CAE (NYSE:CAE) acquired L3Harris Technologies' (NYSE:LHX) Military Training business in July for $1.1 billion. The acquisition is expected to be highly complementary to CAE's core military training business and will broaden CAE's position in training and simulation across multi-domain operations.
- The U.S.' largest military ship builder, Huntington Ingalls Industries (NYSE:HII), acquired Alion Science and Technology from Veritas in August for $1.65 billion in cash at an enterprise value of ~12.2x expected 2022 adjusted EBITDA.
- In its seventh acquisition since going public via SPAC in 2020, Redwire Corporation (NYSE:RDW) acquired space biotechnology company Techshot in November (not disclosed). Techshot's space bioprinting and solutions in microgravity will help enhance Redwire's position as a leading manufacturer in the Low Earth Orbit (LEO) sector.
- SolAero Technologies was acquired by Rocket Lab (Nasdaq:RKLB) in January 2022 for $80 million. This is Rocket Labs' fourth acquisition since going public via a SPAC vehicle in March 2021.
- In March 2022, commercial satellite operator, SES, announced the acquisition of Leonardo DRS' satcom business, Leonardo DRS Global Enterprise Solutions, for $450 million. The acquisition is expected to accelerate SES's strategy of growing its defense and government business.

## Capstone Partners Defense Team Notable Deal Closings 2021 & Q1 2022


- Capstone advised **Cosmic Advanced Engineered Solutions** ("Cosmic AES"), in its sale to Kratos Defense & Security Solutions, Inc. ("Kratos") (Nasdaq: KTOS). The transaction closed in December 2021. Terms were not disclosed though the Company traded well above prevailing market valuations. Cosmic engineers and designed classified and unclassified communications solutions in the Space domain, Electronic Warfare, Intelligence Signals Processing, Missile Defense and Cyber sectors


- Capstone advised **Raytheon's Collins Aerospace in its divestiture of Delavan** ("Delavan") to privately held Beckett Corporation. The transaction closed December 2021. Terms were not disclosed. Delavan is a leading designer and manufacturer of spray nozzles for fluid, diesel exhaust, and spray-drying systems. Delavan has dedicated manufacturing facilities in the U.S. and U.K. and distributors in more than 60 countries.


- Capstone advised **EQT's portfolio company, Saur** ("Saur"), on its acquisition of Aqua Chem, an industrial technology company serving the U.S. Navy and global commercial customers. Aqua Chem is a leading provider of engineered water purification solutions to blue-chip customers in over 40 countries. The transaction is expected to close in Q2 2022, subject to receipt of antitrust approvals and satisfaction of customary closing conditions.

# GOVERNMENT IT SERVICES

## 5 TSUNAMIS AND TECTONIC SHIFTS: THE DEMOCRATIZATION OF TECHNOLOGY FUELS M&A

***"There is a tide in the affairs of men, which taken at the flood, leads on to fortune. On such a full sea we are now afloat, and we must take the current when it serves, or lose our ventures."***

*- William Shakespeare, Julius Caesar*

### 2021: Technology-Based Business Models Mature and Command Attention

In these pages last year, we spent much space replaying the industry's response to the coronavirus pandemic, the uncertainty it imposed on capital markets generally, and its impact on the outlook for discretionary spending accounts that impact the sector. As we closed this report a year ago, we remarked at the significant uptick in M&A activity during the second half of 2020, as the realities of the pandemic came to be understood, injecting confidence back into the market. More importantly, we observed what we termed a "modernization powershift" that was gaining traction throughout the course of the year.

2021 witnessed the continuing acceleration of this trend, as the prevalence of new SaaS-based business models enabled aggressive firms to combine fundamental understanding of government business rules with software automation to streamline workflows and force disruption. The Administration's commitment to modernization remains steady, with FY2022 federal investments in IT totaling $110 billion, a 7.5% increase over what was requested in FY2021; a level analysts predict will grow when the White House's FY2023 budget request materializes next month.

**Government IT Services saw an unprecedent level of dealmaking with a 40% increase in the number of middle market transactions over the previous 2019 recent high, fueled by technological advances and the maturation of disruptive SaaS business models.**

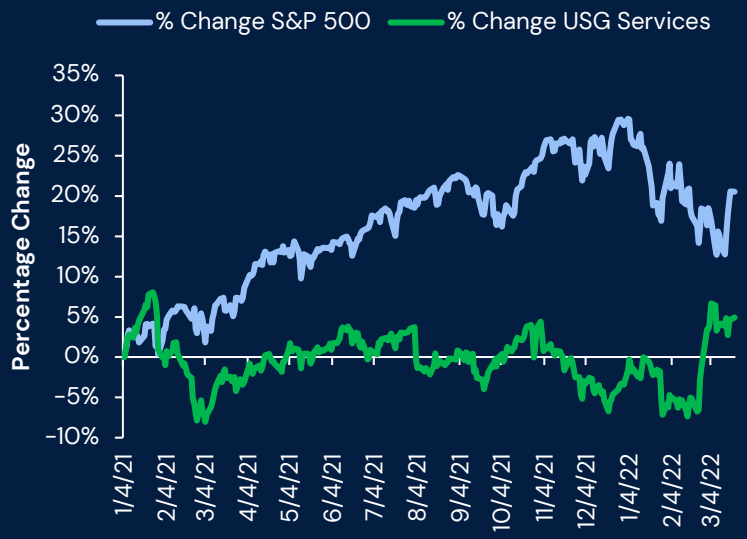
Over the course of 2021, publicly traded U.S. Government IT services companies were buffeted by four exogenous factors that all weighed on their ability to meet investors' expectations of performance: (i) recurrent COVID surges delaying procurement, (ii) the lack of a FY2022 budget until just a couple weeks ago and the impact of a continuing resolution, (iii) staffing shortages due to a tightening labor market, and (iv) the end of significant contracts in Afghanistan as the U.S. withdrew its forces from that country. As such, these stocks underperformed the market and have only recently begun to close the gap, largely due to another external stimulus: the full-scale invasion of Ukraine and the urgent geopolitical competition that is destined to accompany it for the foreseeable future.

Likewise, trading multiples contracted in the face of these headwinds, dropping as low as 10.5x trailing EBITDA and 1.3x trailing revenue early in 2022 before beginning to recover in March. We expect this upward trend to continue as the realities of the FY2022 budget are factored in and the FY2023 budget request reflects the realities of a return to Great Power competition on a global stage.

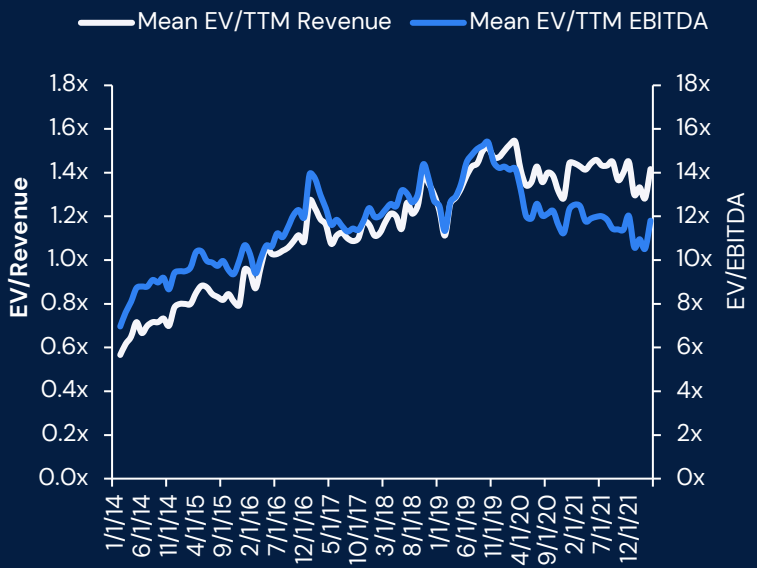
Despite this lackluster performance in the equity markets, the year witnessed a truly unprecedented level of deal making, as strategic acquirers sought to match their access to government customers with emerging technologies to drive inorganic growth and improve their position in critical areas of accelerating government investment including: (i) disruptive SaaS solutions, (ii) agile software development, (iii) data analytics, (iv) cloud computing and IT as a Service, (v) machine learning and artificial intelligence, and of course (vi) cybersecurity. This was a continuation of the same trends we identified a year ago, but at a pace that surprised many industry veterans.

***Strategic acquirers sought to match their access to government customers with emerging technologies to improve capabilities in accelerating areas of government investment.***

**Market Returns, U.S. Government IT Services Index vs. S&P 500**




**Publicly Traded U.S. Government IT Services Index Valuation**



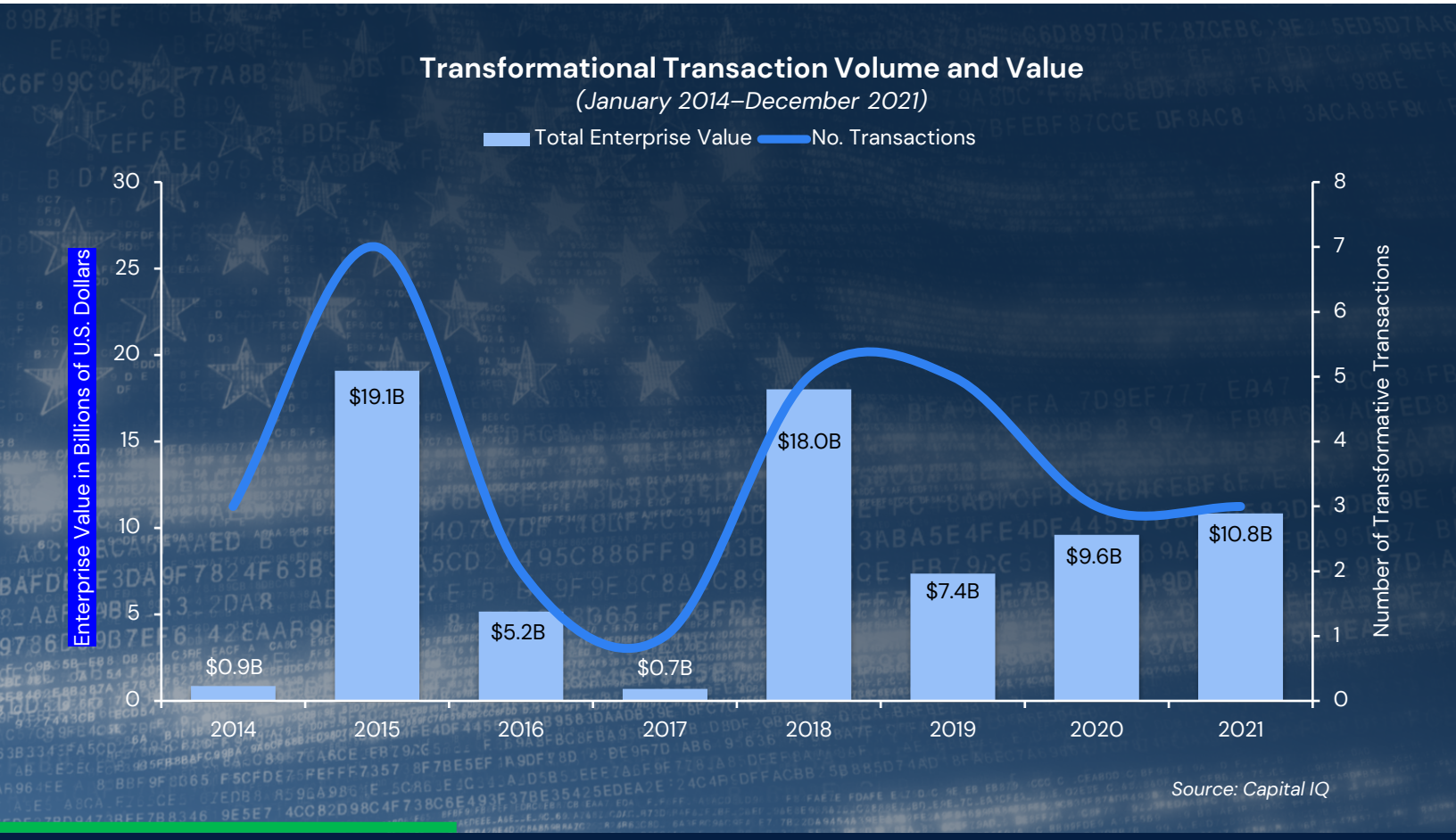

*Capstone U.S. Government IT Services index includes LDOS, BAH, CACI, MANT, SAIC, ICFI.*
*Source: Capital IQ*

## Transformational M&A: Normalization

Since we started tracking so-called transformational transactions amongst the industry's largest players in 2014, these deals took form in pronounced cycles. Since 2018, however, activity has smoothed and normalized, indicating relative competitive stability. During 2021, three scaled transactions were consummated, aggregating $10.8 billion in value, including Veritas-backed Peraton's acquisition of Perspecta (NYSE:PRSP) in May for $6.8 billion. This transaction, came on the heels of Peraton's acquisition of Northrop Grumman's (NYSE:NOC) Mission Systems business in February, which made the company a true peer competitor with the largest public competitors, at $7 billion in annual revenues and 22,000 employees.

In July Huntington Ingalls acquired Alion Science and Technology for $1.7 billion in August, strengthening its capabilities in advanced engineering and R&D (research & development) services and diversifying the business' portfolio.

Finally, Amentum Government Services Holdings, backed by Lindsay Goldberg and American Securities, completed the acquisition of PAE (Nasdaq:PAE) for $1.9 billion in February 2022, complementing its suite of technical services with capabilities in training, sensor and technologies, cyber, and IT.



# Government IT Services: Transformational Transactions

*(January 2014-December 2021, In Millions)*

| Date Closed | Type | Target | Buyer | Seller | Pro Forma TTM Rev | Pro Forma TTM EBITDA | EBITDA Margin % | EV | EV/TTM Rev | EV/TTM EBITDA |
|---|---|---|---|---|---|---|---|---|---|---|
| Oct-21 | M&A | PAE | Amentum | Public | $2,973 | $219 | 7.4% | $1,913 | 0.6 x | 8.7 x |
| Jul-21 | M&A | Alion S&T | Hungtington Ingalls | Veritas Capital | $1,054 | $82 | 7.8% | $1,650 | 1.6 x | 20.0 x |
| Jan-21 | M&A | Peraton | Perspecta | Public | $4,546 | $644 | 14.2% | $7,274 | 1.6 x | 11.3 x |
| Dec-20 | M&A | Peraton | NG Federal IT | Northrop Grumman | $2,300 | $265 | 11.5% | $3,400 | 1.5 x | 13.0 x |
| Mar-20 | M&A | Veritas Capital | DXC State & Local HHS | DXC Technology | $1,400 | undisc. | undisc. | $5,000 | 3.6 x | undisc. |
| Feb-20 | M&A | SAIC | Unisys Federal | Unisys | $689 | $92 | 13.4% | $1,200 | 1.7 x | 13.0 x |
| Dec-19 | M&A | Dynetics | Leidos | Private | $1,000 | undisc. | undisc. | $1,650 | 1.7 x | undisc. |
| Nov-19 | M&A | PAE | Gores Holdings (SPAC) | Platinum Equity | $2,739 | $145 | 5.3% | $1,550 | 0.6 x | 10.7 x |
| Oct-19 | M&A | AECOM Managed Services | LG / American Securities | AECOM | $3,700 | $200 | 5.4% | $2,400 | 0.6 x | 12.0 x |
| Apr-19 | M&A | KeyW | Jacobs Engineering | Public | $495 | $39 | 7.8% | $921 | 1.9 x | 23.8 x |
| Mar-19 | M&A | LGS / Mastadon | CACI | Madison / CoVant | $480 | $82 | 17.1% | $835 | 1.7 x | 10.2 x |
| Sep-18 | M&A | Engility | SAIC | Public | $1,917 | $178 | 9.3% | $2,450 | 1.3 x | 13.7 x |
| Jun-18 | IPO | Perspecta | IPO | Veritas Capital | $4,200 | $683 | 16.3% | $4,422 | 1.1 x | 6.5 x |
| May-18 | M&A | PWC Public Sector | Veritas Capital | PWC | $451 | $60 | 13.3% | undisc. | undisc. | undisc. |
| Apr-18 | M&A | General Dynamics | CSRA | Public | $5,064 | $841 | 16.6% | $9,871 | 1.9 x | 11.7 x |
| Feb-18 | M&A | ECS Federal | On Assigment | Private/LG | $586 | $70 | 12.0% | $775 | 1.3 x | 11.0 x |
| Apr-17 | M&A | Harris IT Services | Veritas Capital | Harris Corp | $1,070 | $86 | 8.0% | $690 | 0.6 x | 8.1 x |
| Aug-16 | M&A | LM IS&GS | Leidos | LM | $5,140 | $488 | 9.5% | $4,600 | 0.9 x | 9.4 x |
| Feb-16 | M&A | L-3 NSS | CACI | L-3 | $1,032 | $68 | 6.6% | $561 | 0.5 x | 10.6 x |
| Nov-15 | IPO | CSRA | IPO | CSC | $5,459 | $909 | 16.7% | $8,207 | 1.5 x | 9.0 x |
| Aug-15 | M&A | SRA | SRA International | CSCGov | $1,400 | $196 | 14.0% | $1,390 | 1.0 x | 10.6 x |
| Aug-15 | M&A | Novetta | Carlyle | ACP | undisc. | undisc. | undisc. | undisc. | undisc. | undisc. |
| May-15 | M&A | Websense | Raytheon | Vista Equity | $375 | $75 | 20.0% | $2,300 | 6.1 x | 30.7 x |
| May-15 | M&A | Exelis | Harris | Public | $3,277 | $515 | $ 0 | $4,730 | 1.4 x | 9.2 x |
| May-15 | M&A | Scitor | SAIC | LG&P | $604 | $91 | 15.0% | $961 | 1.6 x | 10.6 x |
| Feb-15 | M&A | TASC | Engility | KKR/GA | $1,100 | $90 | $ 0 | $1,100 | 1.0 x | 12.2 x |
| Nov-14 | M&A | Blackbird | Raytheon | Private | undisc. | undisc. | undisc. | $420 | undisc. | undisc. |
| Sep-14 | IPO | Vectrus | IPO | Exelis | $1,245 | $69 | 5.5% | $219 | 0.2 x | 3.2 x |
| May-14 | M&A | QinetiQ NA | Vencore | QinetiQ | $740 | $38 | 5.1% | $215 | 0.3 x | 5.7 x |
| Sep-13 | IPO | Leidos | IPO | SAIC | $6,307 | $822 | 13.0% | $4,773 | 0.8 x | 5.8 x |

*Source: Capital IQ and Capstone Research*

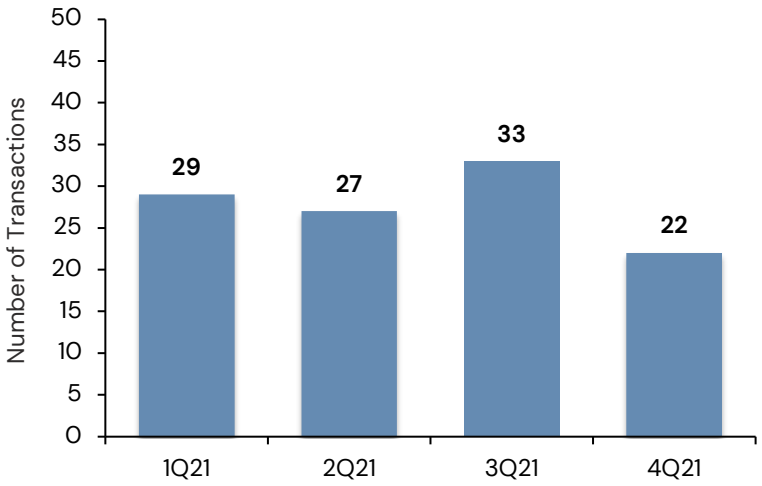
## Middle Market M&A: Disruption Drives Record Deal Making

Entering 2021, the question was whether the strong recovery in middle market M&A we saw in the second half of 2020 would continue despite persistent disruptions caused by COVID-19 and ongoing political wrangling on Capitol Hill. At the time, we pointed to a strong first quarter 2021 as an indicator and maintained that the technological powershift would continue to drive robust activity. What transpired was the most active year in middle market M&A in Government Services we have witnessed, by a wide margin. A strong first quarter was matched throughout the year, and even though overall deals dropped in the fourth quarter, no doubt impacted by the continuing resolution, 22 deals were still closed.

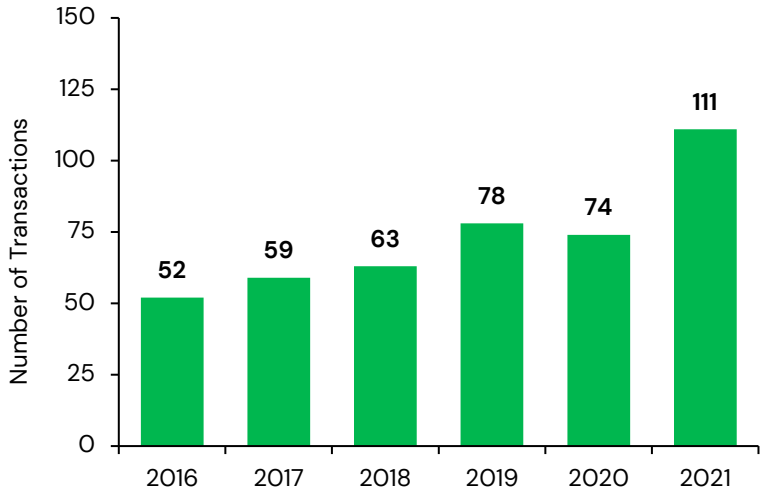
It is hard to underscore the historic year we have just been through. Industry participants completed 111 transactions through the twelve months of 2021, a staggering 40% increase over the previous record in 2019. While it is certainly true that the threat of looming tax legislation impacting long term capital gains rates was a factor in decision-making for closely held businesses, it is equally apparent these transactions loudly demonstrate the trends discussed here: leading strategic acquirers and aggressive private equity-backed companies sought out disruptive technologies and targets well positioned to sell into the highest growth segments of the sector.

We are accustomed to speaking to the fast currents within what is historically a stable (and large), but low growth market. The current political commitment to federal IT modernization, coupled with the emerging geopolitical challenges of this decade, however, may very well result in sustained budget growth over the mid-term. Nonetheless, certain areas of emphasis demand new technologies and innovative approaches, favoring agile middle market firms with proprietary capabilities. These remain the fastest growing segments of the market.

**U.S. Government IT Services M&A Transactions by Volume by Quarter, 2021**



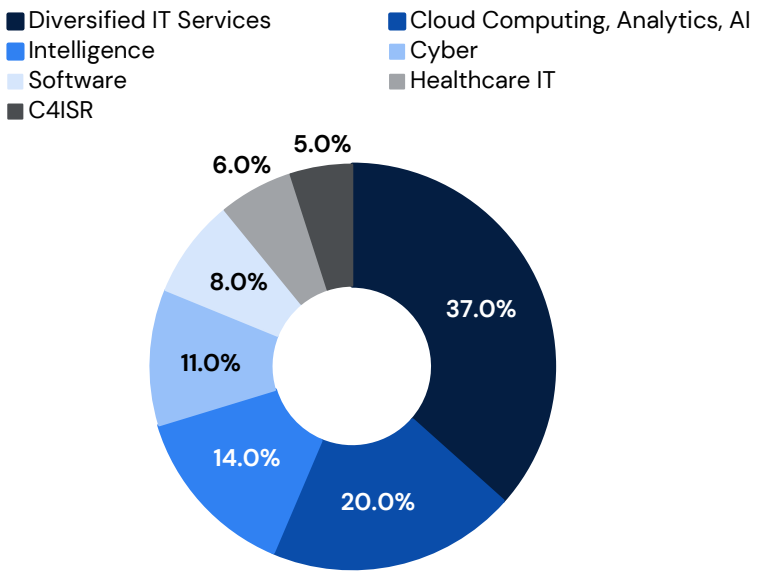

**U.S. Government IT Services M&A Transactions, Annual by Volume**




*Source: Capital IQ, Company earnings reports, Capstone analysis*

**In what has traditionally been a staid, though large, market, we are now witnessing significant real growth. As we look to the future, emerging geopolitical realities will not only sustain current investments, but accelerate the modernization powershift already underway.**

## U.S. Government IT Services M&A Transactions by Subsector, 2021




*Source: Capital IQ, Company earnings reports, Capstone analysis*

The veritable tsunami of transactions completed in 2021 featured scores of emerging companies that are driving innovation in the context of an increasingly critical need to modernize IT infrastructures and disrupt outdated processes through enhanced automation. The rise of commercially accessible SaaS (Software as a Service), business models has only accelerated tectonic shifts that are defining an evolving landscape.

**Targeted segments included:**

- **Diversified IT services**—Firms that possess a suite of IT and professional services and include such offerings as SaaS, IT-as-a-Service, digital transformation and specialized technical and engineering capabilities dominate the deal population and demonstrate the need for acquisition-led growth models across the sector. In an increasingly tight labor market, these transactions also offer value as acqui-hire plays, bringing in scarce talent in areas of critical need. Many companies in this population also hold coveted contract slots on prime vehicles the Government Wide Acquisition Contracts (GWACs) increasingly considered table stakes for significant procurements (more on this below). These deals represented 37% of the middle market transactions closed over the course of 2021, and Capstone was active over this period, representing businesses focused on IT modernization for government agencies as well as SaaS offerings across multiple subsectors.

- **Cloud computing, data analytics, and AI**—Federal spending on cloud computing has been growing at more than 10% annually and will total more than $11 billion in FY2022. The pandemic only served to accelerate a functional imperative that is shared across all Federal agencies. Likewise, investments in artificial intelligence-based technologies are growing at a rate of 50% a year and could exceed $3 billion this year. An all-of-government approach to capturing the promise of AI has spanned two presidencies and the National AI Initiative Office was formally created over the summer to coordinate these activities. Firms with coveted expertise in distributed computing, data analytics and AI comprised 20% of the transactions closed in 2021. The Capstone team represented two government AI firms in 2021 and has several active projects in as of this writing.

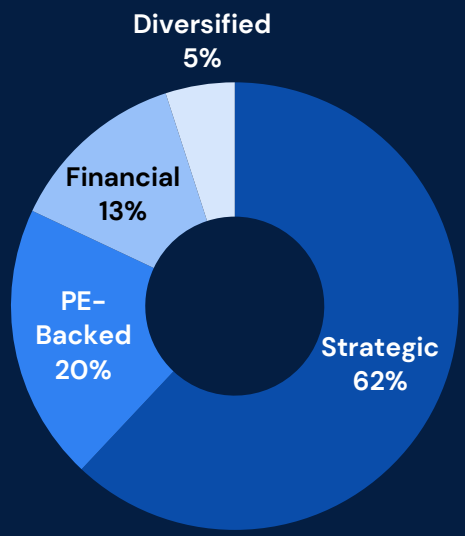
- **Intelligence operations and support**—The contracting approaches taken by the Intelligence Community (IC) support innovation within its contracting base by programming funding streams for emerging firms. These firms leverage security credentials and unique technical expertise to win coveted prime contracts. The FY2022 budget contains $85.6 billion in spending across the 17 intelligence agencies. Intelligence firms made up 14% of the deals closed in 2021, down slightly from 19% in 2020, but still a significant area of focus.

- **C4ISR**—Communications, Command, Control Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) activities represent one of the fastest moving technology spaces that support the warfighter directly. These enabling technologies leverage advances in data analytics, visualization, communications, and software control systems to merge strategic and tactical decision making, shortening the kill chain and transforming the battlefield in fundamental ways. Firms with deep expertise in this area are scarce and highly sought after; as a result, they comprised 5% of the transactions in 2021. C4ISR has historically been an area of focus for Capstone, and 2021 was no exception.

- **Agile software development**—Agile software development, utilizing both Robotic Process Automation (RPA) and Machine Learning (ML) modules can be applied to a wide variety of legacy business processes, enhancing efficiency and improving outcomes. In an era of citizen-driven engagement and the pressing need to maximize the returns on IT investments, these capabilities are in high demand. Packaging highly customized solutions in a SaaS contracting method makes them all that more accessible for the customer. Software development and services firms comprised 8% of the transactions over the past year.

- **Cyber security and cyber operations**—For reasons that are all too well known, Cybersecurity has been one of the fastest growing segments within the federal IT budget for the past decade, and Capstone successfully represented the sellers of four cybersecurity firms in 2021. While FY2021 saw a modest decline in unclassified spending the FY2022 budget increased spending levels 8% to over $20 billion. The introduction of zero-trust architectures across the government is driving additional investments. On top of this, classified and offensive cyber spending represent substantial additional opportunities. Firms that specialize exclusively in cyber activities comprised 11% of middle market transaction volume in 2021, up from 9% a year ago. Rising tensions with peer competitors Russia and China will only accelerate the importance of this segment over the next decade.

## U.S. Government IT Services M&A Transactions by Buyer Type, 2021




*Source: Capital Q, Company earnings reports, Capstone analysis*

When we analyze deals by buyer type, we see virtually the same grouping of acquirers as over the same period last year. Strategic acquirers comprised 62% of the buyer pool, private-equity backed firms 20%, financial investors that specialize in the space 13%, and non-traditional buyers from outside the sector just 5%.

Active strategic buyers include CACI International (ID Technologies, Bluestone Analytics, and SA Photonics), Peraton (Perspecta and VION Cloud), ICF International (Creative Systems and Enterprise Science & Computing), ASGN (Enterprise Resource Performance and Indrasoft), Tyler Technologies (Arx, DataSpec, and NIC), Criterion Systems (SAGE Black, Protas Solutions and Realm Consulting), and Maximus (Veterans Evaluation and Attain's Federal business).

Active private equity-backed strategics include BlueHalo, backed by Arlington Capital (Intelligent Automation), GCOM, backed by Sagewind (ASR Analytics and Qlarion), and Versar, backed by Kingswood Capital (Black & Veatch Environmental and BayFirst Solutions).

Active financial buyers include Godspeed Capital (Exceptional Software Strategies, Ascent Engineering, and Austin Brockenbrough), the Carlyle Group (TwoSix Technologies and IST Research) and Enlightenment Capital (Fenix Group, Artlin Consulting, and Boecore).

## 2022 M&A Outlook: We're Not Done Yet…

As of this writing, the Biden administration's national security team is preoccupied with managing a declining and dangerous Russian power allied with a rising China. The conflagration in Ukraine, while not altering fundamental geopolitical realities, is increasing the pressure on the West to prepare for, and respond to, the peer competition that increasingly frames the operation of the global system. Including Ukraine military and humanitarian assistance, FY2022 defense budget eclipsed $797 billion, a $45 billion increase over the President's request and a $90 billion (12% increase) over the FY2021 enacted budget of $705 billion. Since DoD accounts for roughly 2/3 of total IT and services spending, the market is expanding in dramatic ways. We discussed in our last report the conventional outlook of the current foreign policy team and the President's evident pivot away from the Middle East and to the Pacific, so while the acceleration is real, the path was already set. What is new and different (at least for now) is the strong bipartisan support for the necessary investments.

As we look toward the balance of 2022, we anticipate the long-term trends comprising the modernization powershift will continue to deepen, driven by the democratization of technological disruption, enabled by agile software development and intelligence automation, and the rise of increasingly accessible, service-based business models. Indeed, the resource demands of managing Western allies through the next decade will demand that we realize the efficiencies, performance, and critically, enhanced security, of modernization and automation as rapidly as possible so that investments can be sustained in the capabilities necessary to maintain strategic balance. Technology and services directly supporting the U.S. and allied warfighter will also expand. We fully anticipate a robust M&A market to continue to roll. Some trends to continue to monitor include:

- **Continued emphasis on IT modernization and cloud migration.** While Democratic budget planners were disappointed that the Administration's request to fund the Technology Modernization Fund (TMF) with another $1 billion in FY2022 was zeroed by the Hill, the fund still has $700 million to commit to modernization projects so the miss was somewhat of their own making. We expect another push to increase funds available to this program in the FY2023 request. Meanwhile programs of record aimed at modernizing legacy systems coupled with expanding cloud migration initiatives continue to be high priority investments.

- **Emerging software technologies, AI, and SaaS.** Importantly, the DoD's software and digital technology pilot program, the so called "budget activity eight," received a slight bump in funding, to $714 million in FY2022 form $664 million in FY2021. This is significant since the program is designed to allow solutions to evolve at the pace of development, rather than the relatively glacial speed of budget programming. It bears watching these projects unfold; if they demonstrate strong returns on investment, it would increase pressure on lawmakers to relinquish micromanagement of this dynamic area. At the same time, executive emphasis on AI and automation will continue to support development and customer applications, and the proliferation of customer SaaS solutions will continue to disrupt business processes in the pursuit of greater efficiencies.

- **Continued emphasis on cyber.** As we anticipated, the Federal cybersecurity budget has shifted into high growth, with the unclassified portion increasing 8% to over $20 billion, in addition to substantial investments in classified spending by both DoD and the Intelligence Community (IC). DHS is also playing an increasing role as the Administration seeks to shore up defenses around critical infrastructure including power, water, financial systems and the IT backbone. In the evolving geopolitical contest, advanced cyber capabilities, both offensive and defensive, are increasingly critical, for both deterrence and strategic, opportunistic use.

- **Primacy of GWACs and OTAs.** Annual contract obligations funded through GWACs and Other Transaction Authorities (OTAs) continued to gain favor with government procurement executives, expanding from $13 billion in FY2016 to more than $45 billion in FY2021. The flexibility that these vehicles offer government acquisition officials forms the undergirding of the industry. These vehicles will continue to be utilized for large scale, transformational projects. Holders of coveted prime slots on these vehicles that are not restricted by size or other preference continue to command premium valuations.

**The efficiency and performance born of customized software technologies, powered by AI and packaged as SaaS offerings, will change the nature of what is possible, unlocking new solutions to formerly intractable challenges.**

As we close this year's report, we cannot help but be captivated by the horrific images coming back to us from Eastern Europe, now in color, when it seems like they belong to another time. It is clear that engagement with Western allies and renewed investment in the collective defense of Europe, executed in a thoughtful, calculated manner will characterize the next decade. At the same time, it is abundantly evident that demonstrating a compelling deterrent posture in the Pacific is of equal, and probably greater, importance over the long term. Achieving these goals will require careful planning for Federal agencies as resources will need to be optimized across all budget categories in ways that the Federal government has struggled to realize.

We gain faith, however, from the extraordinarily talented, mission focused entrepreneurs we are privileged to know and represent. It is not hyperbole for us to state here that we have never before seen such a dynamic market environment in the traditionally staid field of government contracting. Customized software technologies, powered by AI and packaged as SaaS offerings are changing the nature of what is possible. Deep technical expertise in cyber, C4ISR, cloud computing, and data analytics are unlocking new solutions to formerly intractable problems. The capital markets remain accommodating: our active M&A processes are garnering record levels of interest, and valuations for firms with captive intellectual property and proven solutions are only increasing. We are proud to play our small role in this evolution by crafting partnerships that supercharge disruption. Capstone Partners stands ready to assist you realize your highest aspirations.

# CYBERSECURITY

## 6 ONE OF THE FASTEST GROWING INDUSTRIES

Cybersecurity for Federal, state and local government entities; companies of all sizes from SMBs (small and midsize businesses) to enterprises; and individuals; continues to rise in importance as digitization accelerates, global geopolitical tensions rise, and adoption of SD-WAN/SASE (software-defined wide area networking/secure access service edge) architecture increases. Recent catalysts for these megatrends include the COVID-19 pandemic, which resulted in an increased number of remote workers and reconfiguration of traditional networks, Russia's invasion of Ukraine, and the never-ending drive for more efficient and effective internet communications, respectively.

**Cybersecurity has become one of the fastest growing industries as attack surfaces have expanded, with more devices connected to the internet, increased remote access/working and growing geopolitical tensions.**

The increased digitization of our world, including a proliferation of SaaS applications and 24x7x365 connectivity, has been both a blessing and a curse. Positively, recent global economic growth has been driven by the internet and related applications which increase opportunities for new products and services, worker productivity improvements and emerging markets. However, vulnerabilities have increased in lock step putting identity, privacy, and digital assets at risk. While common criminals and organized crime seek to exploit online vulnerabilities for monetary gain, nation states may seek broader and more impactful strategic military superiority by attacking critical infrastructure.

Amidst an environment in which spending on cybersecurity has increased at all levels, publicly traded and privately held companies continue to enjoy robust demand for their products and services. As demand outstrips the supply of trained and talented workers, wages have risen, and artificial intelligence (AI) has emerged to help address myriad problems. Adoption of promising new technologies should support robust future spending efforts to maintain parity with increasingly sophisticated threat actors.

Investor expectations for sustained revenue and profit growth for Cybersecurity industry players is clearly reflected in the financial markets. Private equity, venture capital and corporate investment into cybersecurity mergers, acquisitions, and organic growth initiatives reached an all-time high in 2021. The availability of capital for cybersecurity companies at all life cycle stages creates fertile ground for the growth and emergence of more unicorns.

Cybersecurity represents one of the most significant existential threats to our collective prosperity and well-being. Western governments, public and private companies, and industry professionals continue to go above and beyond to help make our world a safer place.

## COVID-19 Update

As the world recovers from the worst of the COVID-19 pandemic, the impacts on the Cybersecurity industry remain lasting and likely irreversible. The drastic increase in employees working remotely across many industries has had a meaningful impact on the way the corporate world works, connects, and utilizes networks. As more tablets, phones, and cameras are connected to the Internet, the need for increased cybersecurity has become exponentially heightened. Without continuous monitoring and proper cybersecurity measures, attackers may enter a company's network easier than ever via a connected employee device and access company secrets, intellectual property, and data. This remote workforce environment is a prominent example of how technology enabled us to maintain worker productivity during the COVID-19 pandemic but also created new vulnerabilities.

### Cost of Damage of Cybersecurity Breaches

The overall cost of cybersecurity breaches has reached a staggering proportion, costing the world an estimated $6 trillion in 2021 and estimated to cost up to $10.5 trillion annually by 2025.[28] In order of magnitude, this is larger than the current GDP of every country in the world aside from the United States and China.

In 2020 there were 79 identified ransomware attacks carried out against government organizations, costing approximately $19 billion in both recovery costs and lost productivity. The severity and consistency of cyberattacks on government entities has continued to increase with over 246 ransomware attacks identified since 2018, likely costing upwards of $53 billion and costing an estimated 4,240 days of down time.[29]

**The total cost of cybersecurity breaches has skyrocketed to an estimated at $6 trillion in 2021. Threats have multiplied ranging from potential nation state attacks on critical power grid infrastructure, to criminals conducting ransomware attacks on small and mid-sized businesses averaging $170k cost.**

Private sector companies also face increasing threats from cybercriminals and are often less financially equipped to handle a major attack than a government organization. For a small or midsize business, the average ransom paid to resolve a ransomware attack was $170,000, which does not include lost productivity nor the potential cost of hiring an IT professional to first combat the attack. That average cost of a ransomware attack jumps to an average of $1.85 million when expanded to other larger organizations, a level of cost that many organizations cannot bear.[30]

Cyber insurance, which was previously just a niche insurance product for specialized companies has increasingly become a portion of many corporations' budgets to help mitigate the risk of losses associated with a cyber breach. As the frequency and severity of cyberattacks have continued to increase cyber insurance premiums have climbed, and are forecasted to grow at a 21% CAGR through 2025.[31]

### Spending in the Cybersecurity Industry

The Cybersecurity market is one of the fastest growing industry verticals in the world, projected to grow from a value of $218 billion in 2021 to $345 billion in 2026,[32] with spending forecasts at both the government and enterprise level expected to exceed $1.75 trillion between 2021 and 2025.[33]

As cyber attacks continue to increase, governments and private sector companies around the world continue to spend increasing amounts to address digital threats. It is estimated that global spending on cybersecurity products and services between 2021 and 2025 will top $1.75 trillion, increasing from just $3.5 billion in 2004. The 2022 US federal budget alone includes $9.8 billion in cybersecurity spending directed to civilian agencies, with an additional $10.4 billion in cyber spending budgeted for the Department of Defense.[34]

Private sector spending has also continued to increase as companies see opportunity to provide advanced services in the sector and the need to defend their customers' data. This has driven the flurry of M&A and investment activity seen over the past three years as large established providers buy smaller companies with new advanced solutions to supplement their own offerings. Some examples of increased private sector investment in the space include Microsoft's (Nasdaq:MSFT) announcement that it would be quadrupling its cybersecurity investment to $20 billion over the next five years (up from $1 billion per year since 2015) and Google's (Nasdaq:GOOG) announcement that it would be investing more than $10 billion over the next five years in cybersecurity, along with their announced acquisition of leading cybersecurity provider Mandiant (Nasdaq:MNDT) in March 2022 for an enterprise value of $5.4 billion.[35]

## M&A in the Cybersecurity Industry

In 2021, there were 410 announced cybersecurity transactions totaling $85.6 billion in disclosed deal value, a 21% increase in number of transactions and a 294% increase in disclosed transaction value over 2020. Strategic buyers continue to comprise the majority of transactions (63%), while private equity buyers (37%) have displayed continued interest in utilizing add-on acquisitions to expand the offerings and the geographic reach of portfolio companies.

| 410 | +21% | $85.6bn | +294% |
|---|---|---|---|
| 2021 Announced Cyber Transactions | Year-Over-Year Increase in Number of Transactions | 2021 Disclosed Deal Value | Year-Over-Year Increase In Deal Value |

Some notable transactions in the cyber security space in 2021 and 1Q 2022 include:

- Thoma Bravo's acquisition of Proofpoint in January for $12.4 billion, the largest cloud software purchase in history.
- CDW's (Nasdaq:CDW) acquisition of Sirius Computer Solutions in December for $2.5 billion, creating one of the largest IT solutions organizations in the world.
- Peraton Corporation, a leading provider of IT services to federal government agencies, acquired Perspecta (NYSE:PRSP) in May 2021 for $6.8 billion through its financial sponsor Veritas Capital.
- Symphony Technology Group, through subsidiary McAfee Enterprises, acquired the product business of FireEye in October 2021 for $1.2 billion, creating one of the largest pure-play enterprise cybersecurity companies in the world.
- Mimecast (Nasdaq:MIME) entered into a definitive agreement to be acquired by Permira through a $5.8 billion public to private leveraged buyout (LBO), allowing the company to expand its go to market strategy and product roadmap.
- Google announced the acquisition of Mandiant for $5.4 billion, expanding Google Cloud's existing strengths in cybersecurity.
- Citrix Systems (Nasdaq:CTXS) announced in January 2022 that it will be taken private by Vista Equity partners, TIBCO Software and Evergreen Coast Capital through a $16.5 billion public to private LBO that will allow the company to accelerate its SaaS transformation, increase investment, and expand its secure hybrid work platform.

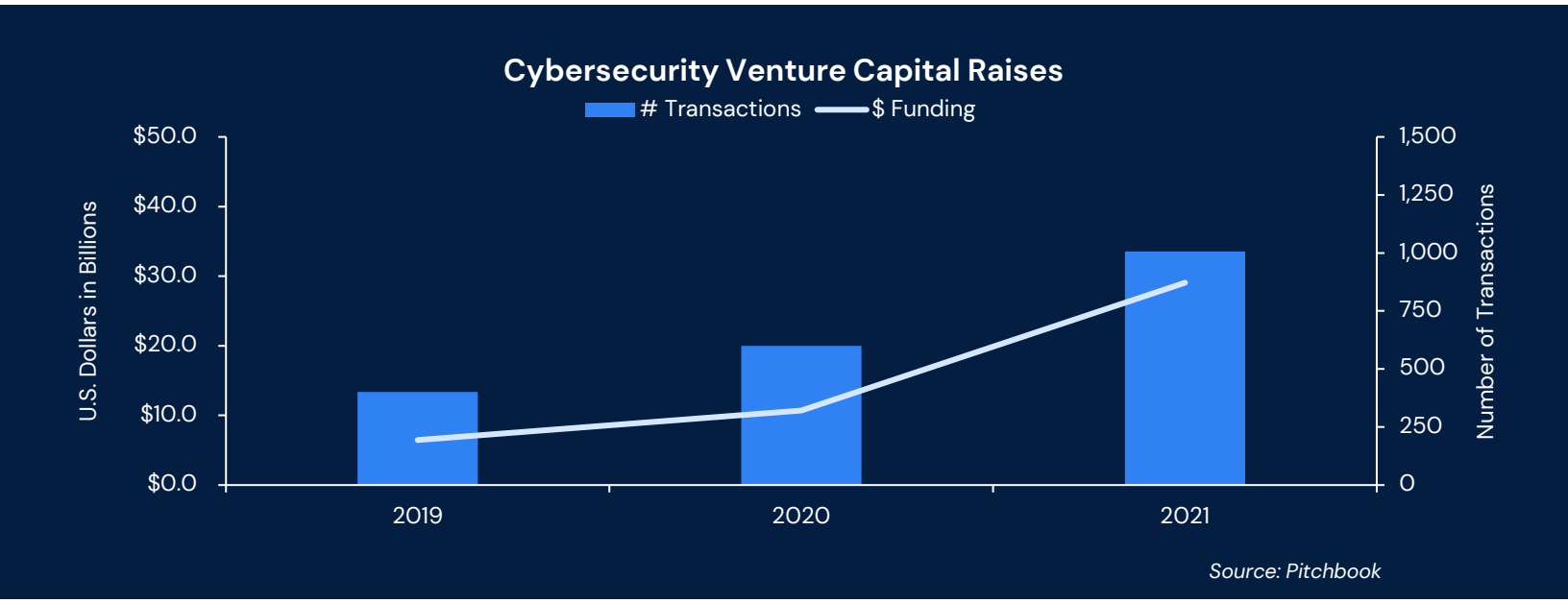
## Private Equity and Venture Capital Investments in the Industry

Companies with successful cybersecurity products and solutions are growing more rapidly and increasing in value faster than ever before. This is partially funded by investment from VC and PE firms who are awash in capital, and where making an early investment into the next Cloudflare can catapult the returns and reputation of an investment firm.

Venture capital investment into the Cybersecurity space has only continued to increase with +$29 billion of disclosed investments into the industry in 2021 across +1,000 transactions, a 68% jump from the 600 transactions completed in 2020 and a 172% increase over the $10.7 billion of disclosed funding raised during the prior year. As competition amongst investment firms to deploy capital profitably has increased and as companies with successful products and offerings continue to grow, they have been able to command larger investment sizes and richer valuations from VC firms, with over 30 cybersecurity companies raising $200 million or more in 2021.

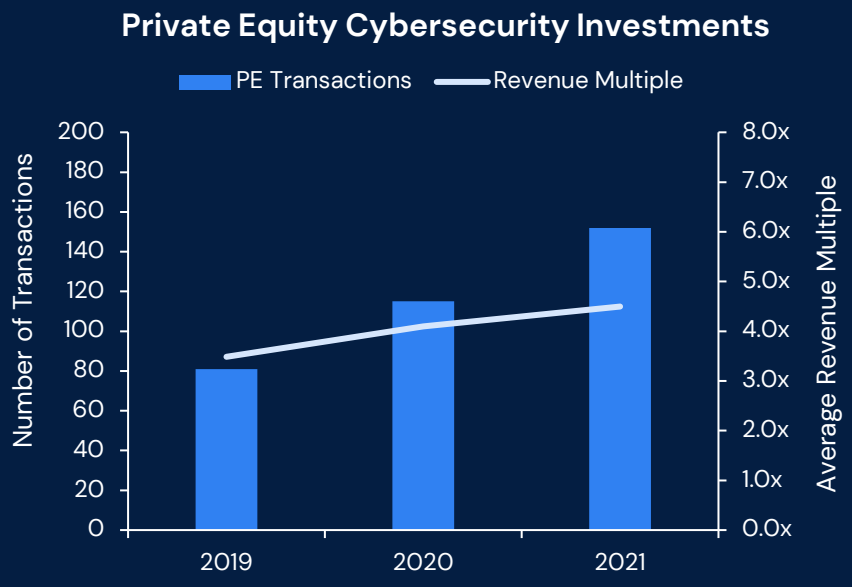
Some notable transactions in the Cybersecurity space in 2021 and 1Q 2022 include:

- Axonius – Raised $200 million in March 2022 from venture firms led by Accel at a $2.6 billion valuation, with an eye on an IPO in the near future. The company has developed a cybersecurity asset management platform that helps companies analyze information from technology assets and devices to identify potential security risks.
- Arctic Wolf- Raised $150 million in venture funding from Viking Global, Owl Rock Capital Group, and others at a $4.15 billion valuation in July 2021 before filing for an IPO in November 2021. The company is expected to IPO in 2022.
- Netskope – Raised $300 million in November 2021 from ICONIQ Capital, bringing its valuation to $7.2 billion. The 10-year-old company has developed a cloud security platform providing visibility and real time data and threat protection while using cloud services, websites, and private applications.
- Lacework – Raised $1.3 billion of venture funding in November 2021 at a $7.0 billion valuation. The financing round was led by Sutter Hill Ventures, Altimeter Capital Management, and Tiger Global Management. The additional capital will be used for fueling cloud security market innovation and to make strategic acquisitions.
- Snyk – Raised $605 million in venture funding from Sands Capital, Tiger Global Management, and others in September 2021, bringing the company's valuation to $8.0 billion. The company plans to use the additional funding to continue product development and improve their technology offering.
- Wiz – Raised $250 million in October 2021 led by Insight Partners and Greenoaks Capital Partners, bringing the company's valuation to $5.75 billion. The Israeli company has developed a platform to help businesses secure their cloud infrastructure at scale and give visibility across a company's clouds, containers, and workloads.



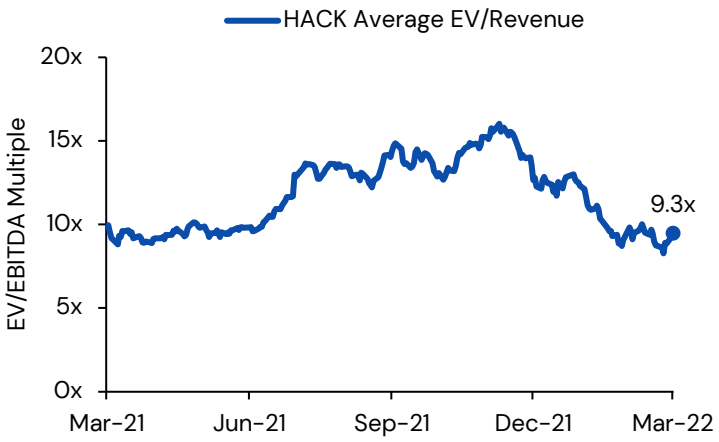
Private equity firms continue to make large investments into cybersecurity companies, building company platforms to capitalize on growing segments of the industry and even taking some previously public and comparatively mature cybersecurity providers back to the private market through large LBOs.

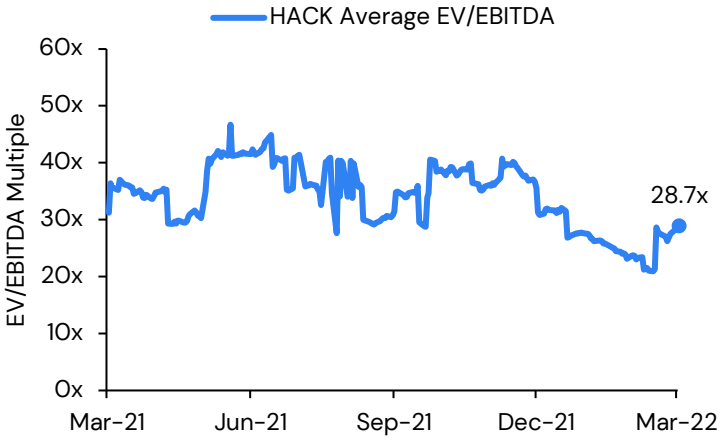
Of the 410 M&A transactions in 2021, consisting of $85.6 billion of disclosed deal value, 38% or 152 were private equity backed. This has trended up from 31% in 2019 and 34% in 2020 as private equity firms have continued interest in making acquisitions in this fast-growing sector, despite the increasingly high multiples commanded by quality companies in the sector.




*Source: Pitchbook*

## Stock Price and Valuation Trends in Cybersecurity




*Source: Capital IQ*

After an exceptionally strong year in 2020, overall investor sentiment in the public markets declined throughout 2021 and into 2022 despite strong economic trends and positive earnings growth due to inflation fears, lingering COVID concerns, and the Russian invasion of Ukraine. S&P 500 enterprise value-to-EBITDA multiple declined from 18.0x in March 2021 to 14.0x by March 2022, with higher growth and more speculative segments of the markets experiencing steeper declines. While significant, this decline merely brings S&P 500 valuation down to the historical three-year average of 14.2x, with higher growth segments of the market such as Cybersecurity remaining well above the historical market average.

After significant outperformance of the S&P 500 by publicly traded security cyber security companies in 2020, as represented by the HACK ETF (Exchange Traded Fund), the index underperformed the broader market through 2021. The HACK ETF average enterprise value-to-EBITDA multiple declined from 31.2x to 28.7x from March 2021 to March 2022, but is still trading at a significant premium to the overall market. The underperformance is mainly attributed to the above mentioned deflation in the valuation of many high growth sectors such as cybersecurity from recent all-time highs, even as many of the underlying companies and the overall industry remain very strong.

## Trend Spotlight: Migration to SD-WAN and SASE Network Architecture

The proverbial 100-foot wave currently engulfing the IT industry is the transition of legacy network architecture and connectivity to a Secure Access Service Edge (SASE) network architecture utilizing Software Defined – Wide Area Network (SD-WAN) connections, allowing for connection to a secure network through a typical broadband internet connection without being routed through a secure corporate data center.

With the explosion of data and information being transmitted across networks, the implementation of this type of network is top of mind for companies and governments, with SD-WAN architecture expected to grow at a 35% CAGR from $1.9 billion in 2020 to $8.4 billion by 2025. U.S. government IT infrastructure is also looking toward this important network transition with the fiscal 2022 Federal Budget including a specific line item for the implementation of zero trust architectures (which SASE is based on), with a price tag of $615 million.[37]

Similar to the effects of the migration to cloud-based infrastructure, the direct connection of a company's network through the internet allows for exponentially higher bandwidth, greater flexibility, and increased productivity at a fraction of the price of a private network. However, the increased connectivity to the internet vastly increases a company's vulnerability to attack, with stringent security protocols, network monitoring, and threat detection being paramount to keeping a SD-WAN based network safe.

To achieve this, it is critical to have interoperability between a company's network operations (NOC) and threat detections (SOC) functions, as many threats to a network detected by a SOC analyst can best be solved through adjustments to the network infrastructure. Most companies do not have the budget or expertise to build out an in-house NOC and SOC, so, as they migrate to a SASE network architecture, they have turned to professional IT service providers who can provide the critical combination of managed network services and security services under one roof.

***Strategic buyers accounted for 63% of transactions and private equity 37%, as firms face emerging technology trends including: adopting SASE network architecture, migrating to the Cloud, building Managed Security Service Providers (MSSP), integrating protections through Extended Detection & Response (XDR) and automating routine tasks through AI.***

## Emerging Trends in Technology

- **Cloud Migration: G**lobal spending on cloud services is expected to reach $482 billion in 2022, up from $313 billion in 2020, with cloud-based infrastructure serving as the backbone of just about every digital service currently used today, according to Gartner.[38] As companies migrate their workloads to cloud based infrastructure and utilize third party cloud-based providers for email, storage, and data analysis, the number of connections to the internet has increased. This increase in internet connectivity and use of third-party tools allows for faster, cheaper, and more efficient productivity but greatly expands the attack surface for cyber criminals to target. This increased exposure has heightened the need for comprehensive cyber defenses across organizations, and in turn driven the growth in outsourced cyber protection through MSSPs and similar providers.

- **MSSP Trends:** MSSPs serve a critical and growing role in IT infrastructure as they have the staff, tools, and capabilities to effectively manage complex networks for customers large and small. The growth in connected devices, sophistication of today's networks, and tight IT labor market have led to growth in Managed Security Service Providers (MSSPs). The number of unfilled cybersecurity roles stands at 2.7 million according to a 2021 (ISC)$^2$ report,[39] with an average cybersecurity analyst salary of +$90,000, making hiring internal cybersecurity staff very difficult for small and medium size firms with limited budgets. The shortage of available talent has caused many operators to employ MSSPs to defend their networks instead of spending heavily to staff up an internal cybersecurity team.

- **Globalization (especially in MSSPs):** As the demand for 24/7 network monitoring and security services have grown and local cybersecurity labor markets remain tight, companies and service providers alike have turned to the global talent pool to meet their needs. The virtualization of the workforce, accelerated by the COVID-19 pandemic, has allowed security service providers to create Virtual Security Operations Centers (VSOCs), which can utilize talent from all over the world to meet the security needs of clients. This global approach can allow for seamless 24/7 coverage utilizing local time zone differences, and from a U.S. company perspective take advantage of some cost savings by utilizing highly trained yet lower cost employees in other locations such as Ireland, Asia, and India.

- **XDR Trends and Usage:** The advancement of Extended Detection and Response (XDR) technology has allowed companies to tie together the potentially disparate cybersecurity systems and protections that they have put in place over the years into a single correlated stream of analysis and alerts. This gives context to the potential alerts that arise and helps reduce the number of false alerts being sent to an analyst to review and remediate. The correlative data provided in the alerts that are passed to an analyst help pinpoint the potential problem and reduce the time needed to detect, respond to, and ultimately resolve an issue or threat. The investment in XDR technology can potentially save a company significant dollars if the alternative is ripping out and replacing existing security detection and alert systems that do not inherently work well together.

- **Artificial Intelligence:** AI has progressed rapidly over the past 10 years, enacting automation of routine tasks that improve effectiveness of a process, increase efficiency, and reduce costs. The Cybersecurity industry has both benefitted from and been challenged by the AI and the automation of security processes and cyberattacks, respectively. As AI has advanced, cybersecurity companies have begun to be able to automate some of the more repetitive process-oriented tasks done by human SOC analysts, such as sorting alerts, data gathering and labeling, and creating reports. This trend is expected to continue with additional and more advanced tasks able to be completed by AI, such as identifying vulnerabilities, threat hunting, and level 1 triage of an alert. The advancement of AI in the industry is expected to benefit all parties in the ecosystem, alleviating some of the current shortage of qualified cybersecurity workers, advancing the speed and accuracy of cyber defenses, and allow SOC analysts to allocate more time to high value work and analysis.

# SIMULATION & TRAINING

## 7 ADDRESSES EVOLVING MARKET REQUIREMENTS AND CAPABILITIES

The utility of, and applications for, simulation and training (S&T) services and technology are broad and continue to grow. Such "learning by doing" is embraced for a myriad of uses that impact Aerospace & Defense but it most commonly relates separately to military needs and to those for commercial aerospace. The demand for each is an evolving function of changing strategic imperatives and the availability of funding that ebbs and flows over time, particularly from the government. For differing reasons, however, training needs in both portions of this market are at heightened levels today.

In 2022, key issues impacting A&D related training services include:

- The most recently espoused National Defense Strategy emphasized preparedness, which is good news for training services, but the inability of the U.S. government to reach a consensus on its spending priorities is impacting the military's ability to execute. At the time of writing this report, a third Continuing Resolution for FY22 was just signed and Congress was struggling to balance a flat defense outlay that is potentially less than the $768 billion contained in the FY22 authorization bill signed by President Biden in late December, with a marked increase in domestic spending. Inevitably, such budgetary uncertainty comes at the expense of services such as training that the Pentagon does not consider a top spending priority.

- The pandemic exacerbated existing pilot supply issues in the U.S. While airlines avoided involuntary furloughs thanks to federal COVID-19 relief funds, they still pruned their ranks of pilots, flight attendants, and other trained staff through voluntary departure packages and early retirements. These departures were necessary to help mitigate the immediate, deep losses that the carriers faced. In North America, with an aging pilot population and heavy use of early retirements, a shortage has reemerged quickly as travel activity has increased and the shortage is now projected to reach over 12,000 pilots by 2023.[40]

**Expansion has been driven by:**

- **Cost pressures and the significant savings advantages offered through simulation rather than through live training**

- **Technological advances providing the ability to simulate situations difficult to create in real life situations, whether those be dangerous crash type scenarios or increasingly complex multi-domain operation conflicts.**

On the military side of things, concern is presently being expressed in the media that American military pilots aren't getting enough preparation for high-end combat. The specific concern is that there has not been enough growth in spending to allow for the services to be ready for a fight. With Congress relying on Continuing Resolutions to fund the government, the Pentagon could end up with a stopgap budget for the rest of this fiscal year. With inflation impacting the Pentagon's purchasing power and increased fuel prices, the Navy said that, if this occurs, it will need to reduce flying hours for all pilots by 10-20% in FY22.[41]

Looking out a few more years, experts believe that the Defense Department's top-line budget is likely to remain fixed or even decline.[42] When it comes to carving up the defense spending pie, the military's push for technological innovation will require money, and Congress will likely continue to fund such military-linked manufacturing. This means the Defense Department will need to find savings elsewhere, including in its Operations and Maintenance (O&M) budget. As O&M pays for training services, maintenance, parts, etc., all such expenditures are at risk. In other words, our desire for readiness or operational tempo may get sacrificed to provide the substantial budget savings needed to address the present spending priorities of the government.

There are legitimate fears that the recent inconsistency in spending levels is creating a skills deficit, even as the world grows more dangerous. The causes for such concern are becoming evident, and, notably, the USS Carl Vinson has experienced five flight mishaps over the past few months, including the crash of a F-35C in January.[43] According to military pilots, aviation accidents are primarily caused by insufficient flight hours, declining proficiency, as well as inconsistent funding.

While such events are a canary in a coal mine for the U.S., significant challenges remain in finding affordable solutions to these alerts. While training needs vary across service and type of aircraft, it is estimated that the average Air Force Pilot needs at least two hundred hours of flight time a year to stay sharp. This equates to roughly three sorties per week. If the DoD pursues reductions in force size, readiness, or operational tempo, it is most likely that spending for live training, the most expensive training activity, will be most impacted while virtual and constructive training activities seem likely to continue growing in importance. This is because the U.S. Air Force's fleet is roughly 30 years old on average, and aging planes are difficult to maintain. To fly more hours, the services need commensurate resources for spare parts and maintenance too. In fact, it is estimated that an hour in an F-35 simulator costs roughly $600 compared with roughly $20,000 per hour in the air,[44] and such vast differences mean that the more cost-effective solutions are likely going to get embraced in greater ways.

Inevitably, the competing dynamics surrounding training, preparedness, and funding are continuing to require increased use of simulation-based training. It is a highly cost-effective and efficient method to help personnel develop their skills. The global Virtual Training & Simulation market is expected to grow at a CAGR of 15.8% from 2021 through 2028, and equal more than $676 billion by 2028, according to the new report published by The Brainy Insights.[45] While these statistics also incorporate applications for medical technology and other educational uses, the overall expected growth of this marketplace is telling. Technology advances continue to help users suspend disbelief regarding simulated uses and are increasing awareness of the growing applications that are resulting. Within the military, virtual training offers trainees exposure to real-life situations where they can experiment and test themselves. It is widely applicable in-flight simulation, serious games, simulation-based gaming, healthcare training, transportation training, and e-learning.

**Demand has been further fueled by pandemic related issues:**

- **In the military, by cost constraints of active training following substantial government covid related expenditures.**
- **For commercial airlines, worsening long term forecast pilot shortages in the face of early retirements during the pandemic.**

In addition, the U.S. Army is also seeking to advance training requirements to best align with the needs of a modernized future force. The expectation is that should conflict occur, our adversaries will most likely employ multiple layers of capabilities in all domains (land, air, sea, space and cybersecurity), and training likewise needs to take on a greater emphasis on multi-domain operations (MDO). In fact, the Army's Simulation and Training Technology Center is realigning its programs to be more MDO centric.[46] The Army is presently looking at how it how can build-up its MDO simulation architectures and then deploy and sustain them over the next 10-15 years.

In summary, what we are witnessing on the military side of things is that training activities are lagging, while the complexity of training needs is growing as are the headaches being caused by our strategic competitors, namely Russia and China. These challenges are compounded by the $4.7 trillion in costs that the GAO estimates the government has absorbed related to the COVID-19 pandemic as these spending levels crowd out the availability of funding for other purposes. Collectively, these issues are enhancing needs for more affordable virtual and constructive solutions, and that portion of the S&T market can only continue to grow.

On the Commercial Aerospace side of things, challenges also exist that require increased simulation and training activities. At the onset of the COVID-19 pandemic in early 2020, the demand for flying plummeted. At the time, there was a surplus of pilots, but airlines started offering early retirement packages in order to reduce their overhead. Such programs tended to target senior pilots because they are the ones who tend to command the highest salaries and could most easily afford to leave.

As air travel has started recovering from its pandemic lows, demand for pilots has again increased. The predicted hiring of pilots over the next twenty years is still about 20% lower than was forecast prior to the pandemic but long-term pilot demand remains strong, according to Boeing's latest Pilot and Technician Outlook.[47] In fact, current pilot shortages are impacting service and major airlines are being forced to proactively address the issue at this time. Among other things, they have put together training programs, flight schools, and other pipeline programs designed to funnel trainees first into their regional affiliates, and then eventually into jobs flying mainline jets, like the Airbus A320 or Boeing 737. "We don't have enough pilots to fly all the airplanes," United CEO Scott Kirby said at the Skift Aviation forum held in November 2021.[48] To best protect its revenue base, United is currently taking pilots from their regional airlines and putting them on longer routes involving bigger planes. Likewise, to help address this problem, the three regional airlines wholly owned by American Airlines are offering new hiring bonuses of $187,500 on top of regular salaries, paid out in stages that culminates in getting flowed through (hired) by mainline American. Many other airlines are offering signing bonuses closer to $50,000, which are often more than a first-year first officer makes. These massive hiring bonuses underscore the challenges that the industry, especially regional airlines, has in hiring new pilots.

In summary, opportunities for commercial pilot training services should only grow over the next few years, continuing a trend-line that was just temporarily halted by the pandemic.

## M&A Overview

Continuing a multi-year trend, sector merger and acquisition activity increased again in 2021. We tracked 98 announced or closed transactions last year, a healthy 34% increase compared to the 73 tracked during the same period in 2020. As we have done in prior years, we focused on transactions touching the Mapping, Modeling, & Simulation space and we do so in order to more broadly assess the growing influence of technology, which we continue to think is considerable.

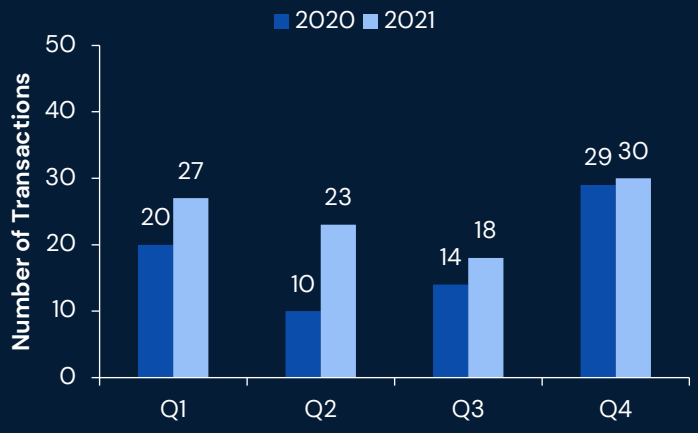
The benefits of advanced technology, particularly in the form of the time and labor savings it often affords, continues to help this sector remain recession resilient. These technologies enable users to operate with better controls. Design work is improved and accelerated, functions are automated and, most important for us, activities can easily be replicated to enhance learning.

Going forward, we expect M&A activity in 2022 will continue to grow, supported by favorable financial conditions, technological innovation including VR (virtual reality), and continued growth in virtual training activities by the military.

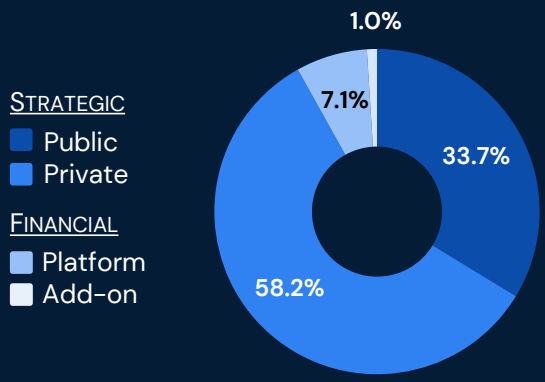
Both strategic and financial buyers remain highly acquisitive in this sector. Like in other areas of Aerospace & Defense, all trails inevitably point to a large Prime contractor as an ultimate acquirer. While private equity firms remained active with both platform and add-on acquisitions, marquee transactions were completed in 2021 by Primes such as BAE and CAE, and by large publicly-traded entities like Ansys (Nasdaq:ANSS); Berkshire Hathaway (NYSE:BRK.A), i.e., Flight Safety; NVIDIA (Nasdaq:NVDA); and Keysight Technologies (NYSE:KEYS).

**Simulation & Training M&A activity increased 34% over 2020 levels with strategic acquisitions expanding providers capabilities in both Civil and Military markets.**

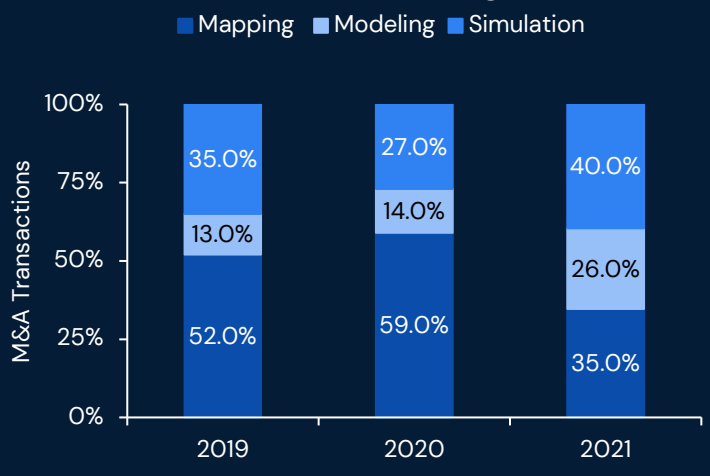
### M&A Activity Remains Strongest in Q4




### Buyer Breakdown




### M&A Breakdown by Segment




*Source: Capital IQ*

## Where is the Smart Money Heading?

Not surprisingly, M&A activity over the past year has favored businesses involved in virtual and constructive training as well as commercial pilot and crew training. Select notable examples are detailed below.

## Notable Transactions

BAE SYSTEMS

To Acquire

Bohemia Interactive SIMULATIONS

In November 2021, BAE Systems entered into a definitive agreement to acquire Bohemia Interactive Simulations (BISim), a global software developer of simulation training solutions for military organizations owned by The Riverside Company.

Using the latest game-based technology, BISim develops high-fidelity, cost-effective training and simulation software products and components to meet the growing demand for defense applications. Upon the successful completion of this acquisition, BAE Systems customers will have access to the company's extensive and proven system integration experience complemented by BISim's innovative training products and solutions to enhance military readiness for the U.S. and our allies.

FlightSafety international

Acquires

FRASCA FLIGHT SIMULATION

In January 2022, FlightSafety International, a subsidiary of Berkshire Hathaway, announced the acquisition of Frasca International.

Frasca is a world leader in the design and manufacture of Flight Simulators, Flight Training Devices and Simulation components. They manufacture both helicopter and fixed wing simulators and their strengths in training development and ab initio flight training are expected to complement FlightSafety's offerings.

CAE

To Acquire

Sabre

AirCentre airline operations portfolio

In October 2021, CAE (NYSE:CAE; TSX:CAE) and Sabre Corporation (NASDAQ:SABR) announced an agreement for CAE to acquire Sabre's AirCentre airline operations portfolio (AirCentre), a highly valuable suite of flight and crew management and optimization solutions.

The agreement, which is valued at U.S. $392.5 million excluding post-closing adjustments, includes the Sabre AirCentre product portfolio, related technology and intellectual property as well as the transfer of AirCentre's highly talented workforce. AirCentre generated approximately U.S. $150 million revenue in the 2019 calendar year (pre-pandemic), and approximately U.S. $55 million in EBITDA for the same period.

# FUTURE M&A ACTIVITY

## 8 WORLD EVENTS AND TECHNOLOGY ADVANCES DRIVE M&A

### World Events, Technology Advances to Further M&A

Geopolitical, economic and public health drivers of M&A include:

- A return to commercial air travel after the pandemic, causing company sellers to reemerge.
- Increased defense spending as Russia's invasion of Ukraine unsettles Europe and brings peer threat into U.S. focus.
- Surface of warfare expands, from economic to infrastructure, and from cyberspace to outer space.

Advances in emerging technologies also fuel M&A:

- Larger firms access technology developments across a breadth of defense, IT, cyber, and training.
- Developments are adopted to improve product & service capabilities, bringing benefits of commercial access, scale, and cost.

**Within subsegments:**

- Commercial Aerospace M&A pace is likely to resume when company performance returns to pre-pandemic levels (industry participants place at mid -2023). Private equity buyers anticipating the uptick are seeking opportunities, while sellers tend to emerge when earnings return to high watermarks, incentivized by the passage of time and having survived another downdraft.
- Increased Defense spending by the U.S. and Western allies in response to geopolitical events and threats of peer challenge is likely to ensure continued investment in technology advancements and space ambitions. This in turn will drive M&A as defense primes and emerging players add new technologies and personnel.
- In Government IT Services, unprecedented M&A activity is fueled by modernization and technology advances, as buyers improve capabilities in accelerating areas of government investment. Advances in software technologies powered by AI and packaged as SaaS offerings create new solutions and further acquisition opportunities.
- Cybersecurity M&A is accelerated by ongoing acquiror needs to access emerging technology tools and trends, while adding scale in the face of ever-expanding attack surfaces and threats from a spectrum of assailants.
- Simulation & Training M&A is also being driven by deals that advance technology developments to further product capabilities in markets which welcome cost advantages, access, and enhancements provided by integrated offerings.

**FUTURE M&A ACTIVITY:**

- **Event drivers: returning commercial air travel, increasing defense spending, expanding scope of warfare.**
- **Emerging technologies: access by larger firms to improve capabilities and commercial application.**

**OUR SERVICES INCLUDE ADVISING ON:**

- Mergers & Acquisitions
- Divestitures & Sale of Businesses
- Raising Debt & Equity Capital
- Refinancing and Restructuring

To learn more about Capstone Partners' Aerospace, Defense, Government & Security (ADG&S) Practice or to discuss the content of this report please contact us.

# 9 RECENT TRANSACTIONS

## AEROSPACE & DEFENSE COMPONENT MANUFACTURING

| Date | Target | Description | Acquirer (Ultimate Parent) |
|---|---|---|---|
| 12/21/21 | Heritage Aviation Ltd. | Provides metal fabrication and wire assembly services to A&D. | The Albers Group |
| 12/16/21 | Magnetic Seal | Manufactures aerospace quality seal solutions. | Ducommun Incorporated (NYSE:DCO) |
| 12/15/21 | GK Mechanical Systems | Manufactures aerospace and military hardware for prime contractors. | Novaria Holdings (KKR) |
| 12/13/21 | TFI Aerospace | Manufactures aerospace fasteners. | TriMas Corporation (Nasdaq:TRS) |
| 12/07/21 | Police Ordnance | Manufactures less-lethal launchers and cartridges. | KWESST Micro Systems (TSXV:KWE) |
| 11/30/21 | Will-Mor Manufacturing | Manufactures complex parts for A&D. | Global Precision (Touchpoint Cap) |
| 11/29/21 | Unical Defense Inc | Manufactures aftermarket component parts for Military Aircraft industry. | Aircraft Fasteners (Audax) |
| 11/18/21 | Networks Electronic Co. | Manufactures mini-pyrotechnic devices for A&D. | ESCO Technologies (NYSE:ESE) |
| 11/17/21 | Metalcraft Technologies | Manufactures aerospace components. | ARCH Precision (Madison Dearborn) |
| 11/17/21 | Island Components Group | Manufactures electromechanical servo-actuators for A&D. | G.W. Lisk Co. |
| 11/15/21 | Assets of Galvion Vehicle Power | Comprises protective equipment for military and tactical clients. | Stryten (Atlast Holdings) |
| 11/10/21 | LoneStar Future Weapons | Manufactures defense weapons. | True Velocity |
| 11/02/21 | ASC International | Distributes aerospace fasteners and related hardware. | Wencor (Warburg Pincus) |
| 11/01/21 | National Engineered Fasteners | Manufactures fasteners for military end markets. | Rexel S.A. (ENXTPA:RXL) |
| 10/26/21 | Performance Plastics | Manufactures composite and metal aerospace products. | JW Hill |
| 10/25/21 | H&W Global Industries | Provides metal finishing, to A&D. | Valence (BCI) |
| 10/18/21 | Stealth Aerospace | Operates as a stocking distributor to the Airline industry. | Aircraft Fasteners (Audax) |
| 10/15/21 | ION Aircraft | Engages in developing aircraft. | Geode Capital |
| 10/12/21 | Onboard Systems International | Manufactures helicopter cargo hook equipment. | Arcline Investment |
| 10/11/21 | Jaunt Air Mobility | Manufactures air vehicles and aircraft. | The AIRO Group |
| 09/28/21 | Kemco Tool And Machine Co. | Provides precision machined parts to A&D. | Crestview Aero (American Industrial) |
| 09/22/21 | XTI Aircraft Co. | Manufactures vertical takeoff airplanes. | Xeriant, Inc. (OTCPK:XERI) |
| 09/20/21 | Aircraft Hardware West | Provides hardware and related services to aerospace. | Clarendon Specialty Fasteners |
| 09/20/21 | H.C. Starck | Manufactures refractory metal powders to A&D. | Materion Corp. (NYSE:MTRN) |
| 09/13/21 | Hunt Valve Co. | Manufactures fluid power engineering solutions. | Fairbanks Morse Defense (Arcline) |
| 09/13/21 | Systems 3 | Manufactures CNC machined parts for Aerospace and Military. | Cassavant Machining (Gallant Cap) |
| 08/12/21 | VT Volant Aerospace | Manufactures aircraft interiors for Boeing and Airbus. | ST Engineering |
| 08/10/21 | Forrest Machining | Manufactures aerospace structures and assemblies. | DVSM |
| 08/10/21 | Seal Science | Manufactures elastomeric components to Aerospace. | Integrated Polymer (Arcline) |
| 07/26/21 | S&S Welding | Provides aerospace tooling, machining, and fabrication services. | Bender CCP |
| 07/23/21 | B&E Manufacturing Co. | Manufactures hydraulic tube fittings A&D. | LISI Aerospace (ENXTPA:FII) |
| 07/15/21 | Bristow Instruments | Engages in aircraft instrument sales and services. | Maverick Aviation Group |
| 07/13/21 | Tanis Aircraft Products | Manufacturer of aircraft engine heating systems. | Hartzell Propeller |
| 07/06/21 | Ridge Engineering | Provides precision machining to the Defense industry. | HEICO Corp. (NYSE:HEI) |
| 07/06/21 | Capco | Manufactures machine gun mounting systems. | Chumash Capital |
| 06/08/21 | Primus Metals | Manufactures machined components A&D. | Angeles Equity |
| 06/01/21 | Barber-Nichols | Manufactures turbo machinery. | Graham Corp. (NYSE:GHM) |
| 05/31/21 | TECT Aerospace | Manufacturer of complex aerostructure components. | Wipro Enterprise |
| 05/04/21 | Cutting Dynamics | Manufactures sub-assemblies and components aerospace. | Re:Build Manufacturing |
| 05/03/21 | The Birken Manufacturing Co. | Manufactures components primarily for the aerospace jet engines. | Enjet Aero (VantEdge) |
| 04/30/21 | Beranek | Manufactures components for A&D. | J&E Precision Tool (LFM Cap.) |
| 04/28/21 | Thermal Dynamics International | Manufactures transmissions and other solutions for the U.S.G. | Alpine 4 (Nasdaq:ALPP) |
| 04/26/21 | PCX Aerostructures | Manufactures airframe assemblies. | Greenbriar |
| 04/19/21 | ARCH Precision Components | Manufactures components for aerospace/defense. | Madison Dearborn |
| 04/08/21 | Air Marine/Airlift | Provides metal finishing to A&D. | Blair-HSM (Three Hills Capital) |
| 03/31/21 | Enginetics | Manufacturer of metal-formed components for aviation. | Enjet Aero (VantEdge) |
| 03/30/21 | AeroCentury Corp. | Comprises ten aircraft assets and related lease rights. | Drake Asset Mgmt |
| 03/18/21 | SilverLight Aviation | Manufactures gyroplanes and ready to fly aircraft. | 808 Renewable Energy (OTCPK:RNWR) |
| 03/09/21 | The Young Engineers | Manufactures precision metallic components for aerospace. | Novaria Holdings (KKR) |
| 03/08/21 | TerraGroup | Operator of water purification systems for armed forces. | HDT Global (Nexus) |
| 03/05/21 | Senior Operations | Manufactures metallic parts for the aerospace industry. | PCX Aero Structures (Greenbriar) |
| 03/02/21 | Global-Tek Manufacturing | Provides engineered manufacturing solutions for Defense. | Crawford United (OTCPK:CRAW.A) |
| 03/02/21 | Composite Resources | Manufactures carbon fiber angles. | Re:Build Manufacturing |
| 02/18/21 | Ampaire | Develops electric powered Commercial aircraft. | Surf Air |
| 02/16/21 | Stevens Manufacturing Co. | Manufactures parts for the Aerospace industry. | Essex Industries |
| 02/11/21 | Colt Defense | Manufactures firearms for military, personal defense. | Ceská zbrojovk (SEP:CZG) |
| 02/10/21 | Red Oak Texas Operations | Manufacturing of composite structures for Aerospace. | Arlington |
| 01/20/21 | Wright Engineered Plastics | Manufactures plastic injection molder for A&D. | Seaway Plastics (Tonka Bay) |
| 01/06/21 | Able Aerospace Adhesives | Distributes specialty aerospace chemicals. | GracoRoberts (CM Equity) |
| 01/05/21 | U.S. Industrial Tool/Arvan | Supplies and manufactures aerospace components. | Esina |
| 01/04/21 | Impresa Aerospace | Manufacturer of aerospace components. | Crestview (American Industrial) |

## SUPPORT SERVICES & MRO

| Date | Target | Description | Acquirer (Ultimate Parent) |
|---|---|---|---|
| 12/21/21 | AVEX | Distributes and exports aircraft. | New State Capital |
| 12/20/21 | Lakota Solutions | Provides support services for military. | Shee Atika |
| 12/20/21 | Crestwood Technology Group | Distributor of parts and materials for Government and Defense. | Triman (AE Industrial) |
| 12/20/21 | Brighton Cromwell | Provider of services for air, land, and sea military system parts. | Triman (AE Industrial) |
| 12/16/21 | Crew Training International | Provides customized training solutions for the DoD. | Exchange Income Corp. (TSX:EIF) |
| 12/16/21 | Fluid Filtration Specialists | Provides flushing and filtration services to Defense. | Fairbanks Morse Defense (Arcline) |
| 11/18/21 | Eagle Creek Aviation Services | Provides aircraft sales and services specializing in aircraft maintenance. | Jet Access Aviation |
| 11/17/21 | Patuxent River | Comprises of a naval air station. | Castellum Inc. (OTCPK:ONOV) |
| 11/11/21 | Bohemia Interactive Simulations | Develops training solutions for Defense. | BAE Systems (LSE:BA.) |
| 11/11/21 | International Marine & Industrial | Marine and offshore protective coatings company. | Stellex/Carlyle |
| 11/04/21 | Lobo Leasing US | Offers aircraft leasing services. | Bill Wolf |
| 10/28/21 | AirCentre of Sabre | Comprises flight and crew management and optimization solutions. | CAE (TSX:CAE) |
| 10/20/21 | Unique One Aircraft Interiors | Provides interior refurbishment for aircraft. | Premier Air |
| 10/20/21 | FBO Cooke Aviation | Offers aircraft fueling, catering, cleaning, and hangar services business. | Propeller Airports |
| 10/18/21 | WorldWide Aviation Group | Operates a fleet of aircraft. | Million Air (VRM Co.) |
| 10/15/21 | Hampton Roads Mechanical | Provides mechanical contracting services for military installations. | Amalgam Capital |
| 10/01/21 | Washington Analysis | Independent research firm for A&D. | CFRA Research |
| 09/30/21 | Sehlke Consulting | Provides consulting services to military customers. | Aeyon (Enlightenment) |
| 09/10/21 | Defense Training of RTX | Comprises training and sustainment services to Defense. | Vertex (American Industrial) |
| 09/09/21 | Trinity Air Medical | Provides air medical escort services and medical transport. | Blade Air Mobility (Nasdaq:BLDE) |
| 09/03/21 | Madison Aerospace | Operates as an aerospace hardware distributor. | Aircraft Fasteners (Audax) |
| 08/20/21 | Lumanair Aviation Services | Provides flight training, fueling services. | Carver Aero (CL Enterprises) |
| 08/11/21 | Trace Aviation | Operates as a repair station. | Precision Aviation ( GenNx360) |
| 08/10/21 | Hy-Performance Hydraulics | Provides on-site repair services to Aerospace. | Airline Hydraulics Corp. |
| 08/09/21 | Red Wing Aeroplane Co. | Offers private jet charter and aircraft management/maintenance services. | VistaJet (Rhone Group) |
| 08/05/21 | Global Jet Services | Provides aviation maintenance training services. | CAE (TSX:CAE) |
| 07/26/21 | GlobalParts Group | Manufactures aviation spare parts to the Aviation industry. | VSE (Nasdaq:VSEC) |
| 07/19/21 | Unical Aviation | Supplies aircraft parts and components. | Platinum Equity |
| 07/15/21 | Sky Warrior Flight Support | Provides aircraft management and maintenance. | Southern Sky Aviation |
| 07/14/21 | Turbopower | Offers engine and component repair and overhaul services. | Battle Investment |
| 07/08/21 | Wilco | Engages in stoking and selling aircraft. | Aero-Labs |
| 07/06/21 | Janesville Jet Center | Provides aircraft maintenance and repair services. | Carver Aero (CL Enterprises) |
| 07/05/21 | Carson Air Ltd. | Provides air cargo services. | Exchange Income Corp. (TSX:EIF) |
| 06/29/21 | Nuviation | Develops SierraTrax, an aviation maintenance tracking software. | Jet Support Services (GTCR) |
| 06/24/21 | Camtronics | Comprises aircraft component repair services. | HEICO Corp. (NYSE:HEI) |
| 06/22/21 | Blackhawk Aerospace | Offers aircraft maintenance and avionics sales. | Blackhawk Modifications |
| 06/11/21 | $800m portfolio of aviation loans | Comprises over 50 loans for approx. 60 commercial aircraft. | AV AirFinance (KKR) |
| 06/08/21 | Used Serviceable Materials | Comprises used serviceable materials distribution assets. | Raytheon Technologies (NYSE:RTX) |
| 06/07/21 | Atlantic Aviation FBO | Provides airport services and operates fixed-based operations. | KKR & Co. |
| 05/20/21 | Keystone Turbine Services | Provides MRO services for aviation engines. | Precision Aviation ( GenNx360) |
| 05/07/21 | Aviation Station | Provides FBO services and aircraft management. | Premier Air |
| 05/04/21 | Skyborne Airline Academy | Operates an airline training academy. | Skyborne Aviation |
| 04/27/21 | Assets of Applied Aerodynamics | Engages in the MRO of radomes and airframe structures. | Spirit AeroSystems (NYSE:SPR) |
| 04/15/21 | Sunshine Services | Provides logistics solutions for aircraft parts. | Sobel Network Shipping |
| 04/06/21 | Premier Aviation Quebec | Offers regional airframe heavy maintenance services. | Sylvain Perron |
| 03/22/21 | Togs Aircraft | Provides MRO services for turboprops, helicopters. | Sage-Popovich |
| 03/02/21 | Partner Jet Corp. | Provides private aviation services. | Volatus Aerospace Corp. (TSXV:PJT) |
| 03/01/21 | HAECO Special Services | Offers MRO support solutions for military aircraft. | VSE (Nasdaq:VSEC) |
| 02/25/21 | Grant Aviation | Owns and operates an airline. | Westward Partners |
| 02/23/21 | Vero Beach Flight Training | Offers pilot training services. | Skyborne Aviation |
| 02/09/21 | Air-Sur | Aerospace insurance management company. | Arthur J. Gallagher (NYSE:AJG) |
| 02/08/21 | FlyEasy Corp. | Offers software for aircraft sourcing. | Tuvoli |
| 02/02/21 | Associated Aircraft Group | Offers private charter, aircraft management, and maintenance services. | OneSky (Directional) |
| 01/28/21 | ETA Global | Offers supply chain solutions to A&D. | AeroMed (Cardinal Health) |
| 01/19/21 | Advanced Air | Provides air charter and scheduled air transportation services. | Carver Aero (CL Enterprises) |
| 01/15/21 | Jet East Corporate Aviation | Provides business aviation aircraft maintenance services. | Gama Aviation (AIM:GMAA) |
| 01/11/21 | Dawley Manufacturing | MRO services and metal fabrication. | Tailwind Technologies |
| 01/11/21 | The Maintenance Group | MRO services and design needs. | Elliott Aviation (Summit Park/Stellus) |
| 01/06/21 | Des Moines Flying Service Inc | Distributes and repairs aircraft equipment. | Muncie Aviation |
| 01/06/21 | Global Aviation Holdings | Provides operational support services for aviation industry. | Investment Recovery Group |
| 01/05/21 | Mountain Aviation | Aircraft management and private jet charter company. | Wheels Up Experience (NYSE:UP) |

# AEROSPACE & DEFENSE ELECTRONICS

| Date | Target | Description | Acquirer (Ultimate Parent) |
|---|---|---|---|
| 12/28/21 | Gresham Worldwide | Manufactures electronics equipment for military. | Giga-tronics (OTCPK:GIGA) |
| 12/22/21 | Ultra Communications | Manufactures photonic components for harsh environment applications. | Samtec |
| 12/16/21 | LCR Embedded Systems | Manufactures rugged enclosures, backplanes, and systems for A&D. | Jll Partners |
| 12/14/21 | Panel Products | Manufactures military simulation and training bezels. | Orbit International Corp. (OTCPK:ORBT) |
| 12/08/21 | Transition Robotics | Manufactures unmanned aerial systems. | Delhivery |
| 11/30/21 | CAM Military | Manufacturer of military equipment. | Prudent American Tech. |
| 11/30/21 | Englander Enterprises | Offers engineering and training services to A&D. | ESAM |
| 11/29/21 | Atlanta Micro | Manufactures broadband RF components for Military. | Mercury Systems (Nasdaq:MRCY) |
| 11/23/21 | Space Micro | Manufacturer and designer of communications for Apace. | Voyager Space Holdings |
| 11/18/21 | Tri-Tek Electronics | Fabricator of cable assemblies and other systems for Aerospace and Space. | Interconnect Solutions (Tide Rock) |
| 11/15/21 | Planetary Systems | Producer of customer-valued separation systems for the Space industry. | Rocket Lab USA (Nasdaq:RKLB) |
| 11/11/21 | ProPhotonix Limited | Manufactures light emitting diode (LED) illumination solutions for Defense. | Exaktera |
| 11/08/21 | Citadel Defense Co. | Manufactures counter-unmanned aircraft systems. | BlueHalo (Arlington) |
| 11/03/21 | SA PHOTONICS | Develops laser communication equipment for A&D. | CACI International (NYSE:CACI) |
| 11/02/21 | Techshot | Offers engineering services to aerospace firms. | Redwire Corp. (NYSE:RDW) |
| 10/26/21 | SemiGen | Specializes in building printed circuit assemblies for military electronics. | Naprotek (Edgewater/Patriot Cap) |
| 10/20/21 | Identified Technologies | Develops self-piloting aerial mapping and land survey drones. | Alpine 4 (Nasdaq:ALPP) |
| 10/19/21 | Advantage Aviation Inc | Manufactures avionics installations and upgrade products. | Leading Edge Avionics |
| 10/12/21 | Advanced Solutions | Operates as an aerospace engineering firm. | Rocket Lab USA (Nasdaq:RKLB) |
| 10/04/21 | Valley Tech Systems | Manufactures rocket propulsion and steering control systems. | Voyager Space Holdings |
| 09/29/21 | RH Laboratories | Manufactures microwave components for Military and U.S.G. | HEICO Corp. (NYSE:HEI) |
| 09/27/21 | Avalex Technologies | Manufactures aerial surveillance mapping. | Mercury Systems (Nasdaq:MRCY) |
| 09/23/21 | Systima Technologies | Manufactures components and integrated systems for Defense and Space. | Karman (Trive Capital) |
| 09/20/21 | Water Vapor Sensing System | Installs aircraft sensors. | FLYHT Aerospace (TSXV:FLY) |
| 09/14/21 | Jennings Aeronautics | Manufactures Small Unmanned Aerial Systems. | UAV Factory (AE Industrial) |
| 09/14/21 | SEAKR Engineering | Manufactures data processing and storage systems for A&D. | Raytheon Technologies (NYSE:RTX) |
| 09/09/21 | ECI Transcon | Manufacturer of electromagnetic components for aerospace. | Quantic Electronics (Arcline) |
| 09/02/21 | Eagle Audio Systems | Comprises P139-HD digital audio system and custom avionics consoles. | Structural Monitoring (ASX:SMN) |
| 09/02/21 | Paktron Capacitators | Manufacturer of polymer film capacitators for Defense and Space. | Quantic Electronics (Arcline) |
| 08/30/21 | FlightAware | Designs global flight tracking solutions. | Raytheon Technologies (NYSE:RTX) |
| 08/30/21 | X-Microwave | Developer of modular design system technology. | Quantic Electronics (Arcline) |
| 08/25/21 | ASSETT | Develops undersea warfare and unmanned systems. | VTG (Jordan Co.) |
| 08/17/21 | BEI Precision Systems & Space | Manufactures components and sub-systems for Space and Military. | Quantic Electronics (Arcline) |
| 08/17/21 | Micro Aerospace Solutions Inc | Engages in space communications systems. | Phantom Space Corp. |
| 08/12/21 | Stellatus Solutions | Develops interactive web portals for government agencies. | Slingshot Aero |
| 08/07/21 | Swarm Technologies | A satellite company providing global connectivity. | SpaceX |
| 08/03/21 | Integral Aerospace | Manufactures flight subsystems and components for aircraft. | PCX Aero Structures (Greenbriar) |
| 07/28/21 | Martin UAV | Manufactures unmanned aerial systems. | Shield AI |
| 07/28/21 | Integrated Microwave | Manufactures IF, RF, and microwave filters. | Knowles Corporation (NYSE:KN) |
| 07/06/21 | DDES | Manufactures space-qualified electronic systems. | BlueHalo (Arlington) |
| 07/06/21 | Uplift Aerospace | Develops technologies for multiplanetary marketplace. | NRP Stone (OTCPK:NRPI) |
| 06/30/21 | Union Technologies Corp | Manufacturer of ceramic capacitators for Aerospace and Military. | Quantic Electronics (Arcline) |
| 06/29/21 | Navigation Aids Business of Moog | Manufactures ground and ship-based RF navigation beacons. | Thales Group |
| 06/11/21 | 3D Robotics | Manufactures drones. | Kitty Hawk |
| 06/07/21 | Apollo Fusion | Manufactures satellite propulsion systems. | Astra Space (Nasdaq:ASTR) |
| 06/03/21 | Eagle Electronics | Manufactures printed circuit boards for the A&D. | Summit (Lindsay Goldberg) |
| 05/27/21 | Pentek | Manufactures ruggedized COTS software. | Mercury Systems (Nasdaq:MRCY) |
| 05/24/21 | AeroData | Develops software-based performance solutions for commercial air carriers. | Garmin (NYSE:GRMN) |
| 05/18/21 | HDT Global | Manufactures shelters and other engineered technologies defense. | Nexus Capital |
| 05/13/21 | Mission Less Lethal | Manufactures Mission 4, TPR and Tactical Compact Rifle launchers. | Byrna Technologies (Nasdaq:BYRN) |
| 05/03/21 | Ticer Technologies | Manufacturer of embedded resistor copper foil. | Quantic Electronics (Arcline) |
| 04/12/21 | TestVonics | Manufactures air data calibrators for DoD. | Raptor Scientific (Five Points) |
| 04/05/21 | The Launch Co. | Manufacturer of ground support equipment for Space. | Voyager Space Holdings |
| 04/01/21 | Area-I | Designs flight controls and testing of unmanned systems. | Anduril Industries |
| 03/22/21 | Abaco Systems | Provides open architecture computing systems for A&D. | AMETEK, Inc. (NYSE:AME) |
| 03/08/21 | Planar Monolithics Industries | Manufactures communication devices for Space and Military. | Quantic Electronics (Arcline) |
| 03/03/21 | Corry Micronics | Manufactures RF, microwave, and other electronic components. | Quantic Electronics (Arcline) |
| 03/02/21 | Infinity Fiber | Manufactures aerospace electrical wire assemblies. | Horizon Telecom (Novacap) |
| 03/01/21 | Combat Propulsion Systems | Military engines and transmissions manufacturing business. | Renk (Triton) |
| 02/23/21 | ATM Voice | Air traffic management communication providers. | Frequentis AG (XTRA:FQT) |
| 02/18/21 | Horizon Aircraft | Operates as an aerospace engineering company. | Astro Aerospace (OTCPK:ASDN) |
| 02/16/21 | CALCULEX | Manufactures electronics for Military and Aerospace. | Vance Street |
| 02/09/21 | American Automated Engineering | Manufacturer of space vehicle equipment. | Karman (Trive Capital) |
| 01/28/21 | 313Aerospace | Manufactures military relay and solenoid/actuator applications. | Aero-Mach Labs |
| 01/19/21 | Oakman Aerospace | Manufactures open architecture space system and spacecrafts in the U.S. | Redwire Corp. (NYSE:RDW) |
| 01/13/21 | Arcturus UAV | Manufactures unmanned aircraft systems. | AeroVironment (Nasdaq:AVAV) |
| 01/13/21 | TRM Microwave | Manufacturer of RF and microwave components for military and space. | Quantic Electronics (Arcline) |
| 01/12/21 | Safe Flight Instrument | Manufactures aviation safety and flight performance systems. | Loar Group (Abrams) |
| 01/05/21 | Cristek Interconnects | Manufactures interconnect products for military/aeorspace prime contractors. | Hermetic Solutions (Windjammer) |
| 01/04/21 | InterTronic Solutions | Manufactures antenna systems, surveillance and radar. | Calian Group (TSX:CGY) |
| 01/04/21 | Teledyne FLIR | Develops industrial technologies and defense technologies. | Teledyne Technologies (NYSE:TDY) |
| 01/04/21 | Systems Engineering Group | Provides systems engineering and analysis services for Defense. | Axient (Sagewind) |

# DEFENSE IT & TECHNOLOGY

| Date | Target | Description | Acquirer (Ultimate Parent) |
|---|---|---|---|
| 12/21/21 | Allegient Defense | Manufactures unmanned air systems and IT to Defense. | NowVertical Group (TSXV:NOW) |
| 12/16/21 | InTec | Defense contractor that provides systems engineering. | ANSER (ASRC Federal) |
| 12/16/21 | ADGA Group Consultants | Provides engineering consultancy services to Defense. | Commissionaires Ottawa |
| 12/13/21 | Creative Systems and Consulting | Provides IT consulting services to Federal Agencies. | ICF International (Nasdaq:ICFI) |
| 12/08/21 | Arena Technologies | Offers technology consulting services to Intelligence and Defense. | Systems Planning (CM Equity) |
| 12/08/21 | The DataTech Group | Provides data warehouse and decision support systems to government. | TORCH Research (WestCap) |
| 12/02/21 | Entegra Systems | Provides analytic solutions to U.S. government defense/intelligence customers. | Acclaim Technical Services |
| 11/23/21 | Asymmetrik Ltd. | Provides technology consulting and analytics solutions for the U.S.G. | BlueHalo (Arlington) |
| 11/17/21 | Government Services Group | Government institution that offers consulting services. | Anser Advisory (Sterling Inv.) |
| 11/16/21 | RenXTech | Provides consulting services to the Federal Government. | Buchanan & Edwards |
| 11/15/21 | Link3D | Develops 3D printing workflow software for A&D. | Materialise (Nasdaq:MTLS) |
| 11/01/21 | Gryphon Technologies LC | Provides engineering support to U.S. security. | ManTech International (Nasdaq:MANT) |
| 11/01/21 | Comtech Telecommunications | Develops communications solutions for government clients. | Acacia Research (Nasdaq:ACTG) |
| 10/26/21 | Federal Resources Supply Co. | Sells safety and homeland security products for war fighters. | Noble Sales Co. |
| 10/25/21 | PAE Incorporated | Provides operational solutions for the U.S. government. | Amentum (American Securities) |
| 10/12/21 | NetCentrics | Provides cyber security for defense and federal customers. | Cerberus Capital |
| 10/12/21 | Defined Technologies | Provides telecommunications and support services to Federal agencies. | Comcast (Nasdaq: CMCSA) |
| 10/06/21 | Systems Planning and Analysis | Provides knowledge-based solutions for national security objectives. | Arlington |
| 10/04/21 | Array Holding Co. | Optimizes mission performance for the U.S. DoD. | CGI Federal (TSX:GIB.A) |
| 09/30/21 | SES Business of Peraton | Comprises technology-focused services and solution for Aerospace. | CTFV Acquisition (Veritas) |
| 09/30/21 | Aeyon | Provider of management consulting to the federal government. | Enlightenment Capital |
| 09/21/21 | Protas Solutions | Operates as a government contractor that offers data science. | Criterion Systems |
| 09/14/21 | exactEarth Ltd. | Provides maritime vessel data for ship tracking. | Spire Global (NYSE:SPIR) |
| 09/14/21 | VariQ | Provides IT services to government clients. | Capgemini SE (ENXTPA:CAP) |
| 08/24/21 | MCR | Provides cost and resource analysis to the federal government. | Arlington |
| 08/19/21 | Intelligent Automation | Develops technology for federal agencies. | BlueHalo (Arlington) |
| 08/11/21 | GovTribe | Online platform to compete in the Federal Contracting market. | Government Exec(Growth Catalyst) |
| 08/02/21 | Sayres and Associates Corp | Provides security and training support services to the DoD. | Broadtree Partners |
| 07/26/21 | Sentek Global | Comprises engineering and cybersecurity business for the U.S. Navy. | Deloitte Touche |
| 07/22/21 | Pro-Sphere Tek | Specializes in IT planning and design for the federal government. | Planned Systems International |
| 07/22/21 | Heron Systems | Develops AI-enhanced autonomy and mission planning solutions for Defense. | Shield AI |
| 07/16/21 | IndraSoft | Provides IT consulting and cybersecurity services. | ASGN Inc. (NYSE:ASGN) |
| 07/15/21 | Occam's Razor Tech | Develops cyber tools and integrated solutions for Defense. | Avantus (NewSpring) |
| 07/13/21 | Volant Associates | Technology integrator for Intelligence and Defense. | Octo Consulting (Arlington) |
| 07/13/21 | MEI Technologies | Provides services in systems design and development for Space. | Alpha Space (Ocoest/ Researchphan) |
| 07/08/21 | RDA | Acoustical engineering, anti-submarine warfare system prototyping. | Sentient Digital |
| 07/08/21 | Salient CRGT | Develops software applications for government clients. | GovernmentCIO (Welsh Carson) |
| 07/06/21 | Alion Science and Technology | Provides engineering solutions for Defense and Government. | Huntington Ingalls Industries (NYSE:HII) |
| 07/01/21 | Capstone | Provides IT consulting services for Military. | Client Solution Architects |
| 06/30/21 | Two Six Labs Holdings | Develops cyber threat intelligence solutions. | Two Six Tech. (Carlyle Group) |
| 06/23/21 | Govlist | Develops procurement workflow automation for government clients. | OpenGov |
| 06/21/21 | Military Periscope & Contracting | Comprises contracting intelligence tool. | Government Exec (Growth Catalyst) |
| 06/15/21 | The Matrix Operating Group | Provider of spectrum intelligence and operations. | AEVEX (CoVant/Madison Dearborn) |
| 06/10/21 | Technology Security Associates | Offers digital engineering solutions to Defense. | John H Northrop |
| 06/10/21 | BlackHorse Solutions | Provides cyber solutions for defense. | Parsons Corp. (NYSE:PSN) |
| 06/10/21 | Roland & Associates | Develops civil-military simulation and analysis products. | Valkyrie Enterprises |
| 06/01/21 | Novetta Solutions | Provides analytics that detect threat and fraud. | Accenture plc (NYSE:ACN) |
| 05/26/21 | Qlarion | Develops business intelligence and data management services. | Gcom Software (Sagewind) |
| 05/19/21 | Wingman Defense Inc | Develops systems for ground, maritime, and aerial applications. | ThayerMahan (AE Industrial) |
| 05/18/21 | C2S Consulting Group | Offers cloud consulting services to the government. | Smartronix (OceanSound) |
| 05/13/21 | MHM Innovations | Provides cyber security to government. | Integrity Management Consulting |
| 05/04/21 | Full Flight Simulators | Comprises two aviation training devices. | ANA Holdings (TSE:9202) |
| 05/03/21 | McKean Defense Group | Provides IT solutions to federal customers. | Noblis |
| 04/08/21 | Orbis Operations | Provides situational awareness and tactical training. | McNally Capital |
| 04/02/21 | ACENT Laboratories | Manufactures ground and flight test systems. | Calspan |
| 04/02/21 | Exostrategies Inc | Provides space and intelligence program services. | Ensco |
| 03/31/21 | Focus Government Services | Offers analytical solutions. | Deep Labs |
| 03/25/21 | Prime Government Solutions | Develops cloud based legislative management software. | Rock Solid Techn. (Strattam) |
| 03/24/21 | Tactical & Survival Specialties | Designs tactical and specialized operational equipment. | Noble Sales Co. |
| 03/23/21 | SEACORP . | Offers software and hardware engineering services. | Kopani |
| 03/08/21 | Blackbox Biometrics | Develops systems to protect warfighters. | AirBoss of America (TSX:BOS) |
| 03/03/21 | AT&T Government Solutions | Provides integrated IT solutions to the federal government. | Tyto Athene (Arlington) |
| 03/01/21 | L-3 Link Simulation & Training | Supplies simulation systems and aircraft contractor logistics support. | CAE (TSX:CAE) |
| 03/01/21 | Federal division of Attain | Comprises business process services to Federal market. | Maximus, Inc. (NYSE:MMS) |
| 02/24/21 | DECO/GovSource | Provides law enforcement and military training services. | IDS |
| 02/24/21 | Intelligent Systems Group | Develops artificial intelligence-enabled solutions. | AeroVironment (Nasdaq:AVAV) |
| 02/23/21 | Deployable Space Systems | Manufacturer of mission-enabling deployable space systems. | Redwire Corp. (NYSE:RDW) |
| 02/23/21 | Gibbs & Cox | Provides ship engineering and design services for navies. | Leidos Holdings (NYSE:LDOS) |
| 02/16/21 | Whitney Bradley & Brown | Management consultant to federal government clients. | Serco Group plc (LSE:SRP) |
| 02/10/21 | Millennium Engineering | Engineering contracting company to the DoD. | Axient (Sagewind) |
| 02/10/21 | Pivotal Insight | Provides management consulting services to Military. | Forge Forward |
| 02/08/21 | Cubic | Operates systems for C4ISR customers. | Evergreen/Veritas |
| 01/27/21 | Perspecta | Provides enterprise IT services to Government. | Peraton (Veritas) |

# FIRM TRACK RECORD

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Select Capstone ADGS Transactions

| | | | |
|---|---|---|---|
| DELAVAN A subsidiary of Collins Aerospace HAS BEEN ACQUIRED BY Beckett CORPORATION | CirComp HAS BEEN ACQUIRED BY ALBANY INTERNATIONAL | Aeronautics HAS ACQUIRED CHASSIS PLANS Systems Engineered to Perform | Cosmic HAS BEEN ACQUIRED BY KRATOS DEFENSE & SECURITY SOLUTIONS |
| BACKBONE HAS BEEN ACQUIRED BY CYNERGISTEK | CUMMING MICROWAVE HAS BEEN ACQUIRED BY PPG | saur A PORTFOLIO COMPANY OF EQT TO ACQUIRE AQUA CHEM Pending | DGI HAS BEEN ACQUIRED BY SOSi |
| VIGOR HAS BEEN ACQUIRED BY The Carlyle Group stellex | DiSTI HAS PARTNERED WITH AKOYA DOS RIOS | GPS SOURCE HAS BEEN ACQUIRED BY GENERAL DYNAMICS Mission Systems | sci Sensor Concepts Inc. HAS BEEN ACQUIRED BY RAPTOR SCIENTIFIC CAPITAL PARTNERS |
| cambridge GLADSTONE INVESTMENT HAS BEEN ACQUIRED BY biamp. HIGHLANDER | STRATOZEN HAS BEEN ACQUIRED BY ConnectWise A portfolio company of THOMABRAVO | JAMESON HAS BEEN ACQUIRED BY HUSKY | neya SYSTEMS HAS BEEN ACQUIRED BY ARA |
| ROOK SECURITY HAS BEEN ACQUIRED BY SOPHOS | Bolton REMOTE HAS BEEN ACQUIRED BY SUPPORT NINJA a portfolio company of bv | DRI a U.S. subsidiary of FIRST HAS BEEN ACQUIRED BY TE | Ravn ALASKA HAS BEEN RECAPITALIZED BY J.F. Lehman & Company |
| GC&E SYSTEMS GROUP HAS BEEN ACQUIRED BY Bristol Bay | SOLIDYN SOLUTIONS, INC HAS BEEN ACQUIRED BY POLARIS ALPHA | CYGILANT A portfolio company of Arrowroot Capital HAS BEEN ACQUIRED BY SilverSky | SAFE ELECTRONICS INC. HAS BEEN ACQUIRED BY AN UNDISCLOSED STRATEGIC BUYER |

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## Sector Specialization

- **Aerospace**
- **Defense**
- **Physical Security**
- **Cybersecurity**
- **Government**
- **C4ISR**

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CAPSTONE PARTNERS

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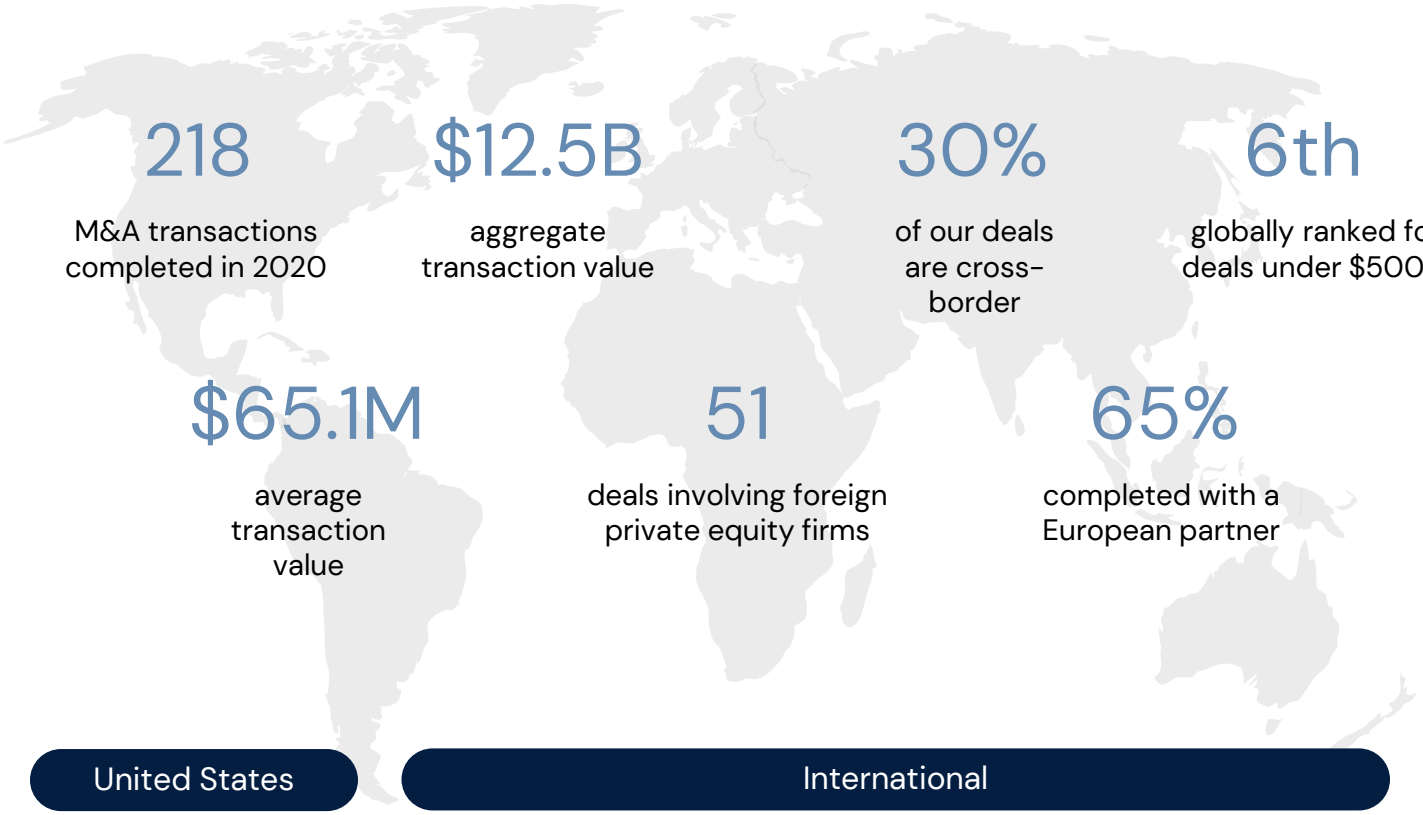
# Market Presence

With a long-established U.S. footprint, together with an international partner platform, we provide clients with broad expertise and access to key market relationships on a global basis. Our presence is backed by ~175 professionals in the U.S. with 450+ professionals across 43 countries.



**218**
M&A transactions completed in 2020

**$12.5B**
aggregate transaction value

**30%**
of our deals are cross-border

**6th**
globally ranked for deals under $500m

**$65.1M**
average transaction value

**51**
deals involving foreign private equity firms

**65%**
completed with a European partner

## United States

175+ professionals
12 offices

Boston · Chicago · Dallas · Denver Detroit · Los Angeles · New York Orange County · Philadelphia Richmond · San Diego · Tampa

## International

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