Oaklins

SPOT ON
AIRCRAFT SYSTEMS

Jason Kimball, Oaklins' aircraft systems specialist, is pleased to share some industry perspective in this edition of Spot On.

"The global A&D market's strong growth — driven by increased passenger travel and strong aircraft backlogs, coupled with record mergers and acquisitions (M&A) levels — continues unabated. Average disclosed transaction multiples still exceed 10.0x within many A&D segments. Boeing and Airbus are maintaining the pressure on their supply base in order to meet monthly single-aisle aircraft production demands. As of 2017, the global A&D industry was valued at US$838 billion. Commercial and military aircraft and engine original equipment manufacturers (OEMs) and their supply base account for almost half of the global A&D industry, with the remainder consisting of civil and military maintenance, repair and overhaul (MRO), satellites, defense electronics, missiles and unmanned aerial systems. The USA continues to play a leading role in the global market, accounting for 49% of global aerospace economic activity — which is more than the next 25 countries combined — followed by France (8%), China (6%), the UK (6%) and Germany (5%). The USA's lead position is a result of US companies' dominance in most key A&D segments. Many of the largest players are domiciled in the USA, including the largest commercial airframer (Boeing), largest military airframer (Lockheed Martin), largest engine OEM (GE Aviation) and the largest aircraft systems OEM (UTC Aerospace Systems/Rockwell Collins), as well as prominent players in space and unmanned aerial systems.

This Spot On highlights the primary locations, players, transactions and trends that help bolster the USA's position in the global A&D economy. We feature the top 18 clusters that support growth in the USA and overseas.

As previously mentioned, aircraft systems and aerospace M&A activity, particularly in the USA, is expected to remain elevated as the OEMs' forceful supply chain encroachment and aftermarket expansion drives suppliers to consolidate for scale and costs. The current hot market environment is also conducive to further consolidation. Fear of missing out on the window of opportunity to capitalize on strong valuations is a powerful motivator for many middle-market A&D players to begin the process of selling."

MAJOR A&D CLUSTERS
in the USA

US A&D COMPANIES

BOEING
GE Aviation
LOCKHEED MARTIN
UTC Aerospace Systems

DENVER, COLORADO

Denver plays a critical role in the development and production of the space segment within the larger A&D industry. The local aerospace ecosystem is anchored by Lockheed Martin's Space Systems Division, with other large players present, such as Ball Aerospace, Raytheon and United Launch Alliance. Lockheed has been integral to this development as they partnered with Boeing to form United Launch Alliance, which has since grown to employ over 3,000 people — generating over US$1 billion of annual revenue.

Selected company profiles

Lockheed Martin Space Systems	• Revenue: US$9.5 billion • Employees: 18,000 • Overview: Lockheed Martin Space, one of four reporting Lockheed Martin segments, designs satellites and other space systems and services
Ball Aerospace & Technologies	• Revenue: US$991 million • Employees: 2,800 • Overview: Ball's Aerospace Division develops instruments and sensors, tactical camera systems and full satellite systems
ULA	• Revenue: US$1.3 billion • Employees: 3,800 • Overview: ULA, founded as a joint venture between Boeing and Lockheed Martin, was created to provide space launch services for the US government

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Jun-2018	Inmarsat PLC	EchoStar Corporation	8.4x	4.1x	5.9bn
Jan-2018	Strategic Simulation Services	Airbus	-	-	-
Oct-2016	The Radiant Group	DigitalGlobe	-	-	140m
Sep-2016	Bright Aerospace	Raytheon	-	-	-

SEATTLE, WASHINGTON

Seattle is a premier A&D market due to both legacy, blue-chip firms, such as Boeing, and the entrance of innovative new companies, such as Jeff Bezos' venture into rocket and space technology, Blue Origin. Boeing, incorporated in 1916, has been the anchor of the aerospace community in Seattle and has grown to become the 25th most respected company in the world, according to Fortune. Despite Boeing's official headquarters being moved to Chicago in 2001, Boeing Commercial — the company's largest division — is still based in the Seattle area. Since Seattle established itself as an elite aerospace hub in the USA, many other premier aerospace companies have migrated there, seeking to capitalize on opportunities for partnerships and potential growth. The greater Seattle area and the state of Washington claim over 136,000 highly skilled workers, providing a foundation and workforce that companies can build on.

Selected company profiles

Blue Origin	• Revenue: N/A • Seattle presence: 280,000 square feet on 26 acres • Founded: 2000 • Blue Origin is attempting to develop technology enabling private human access to space • Current products include a reusable vertical take-off, vertical-landing space rocket made with various engines
Crane Aerospace & Electronics	• Revenue: US$691 million • Founded: 1855 • Crane Aerospace and Electronics supplies systems and components through eight subsidiary companies • Current products include landing gear systems, fluid management, cabin systems, power systems and microwave systems
Esterline Technologies	• Revenue: US$2 billion • Founded: 1967 • Market cap: US$3.5 billion • Esterline serves its customers through its avionics and controls, sensors and systems, and advanced materials business segments • Divested Kirkhill Elastomers to TransDigm Group for US$50 million in March of 2018 • In October 2018, announced the acquisition of Esterline Technologies by TransDigm Group (NYSE: TDG) for US$4.1 billion

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Oct-2018	Esterline Technologies	TransDigm	14.7x	2.0x	4.1bn
May-2018	KLX	Aviall (Boeing)	15.7x	2.5x	4.2bn
Mar-2018	Kirkhill Elastomers	TransDigm	-	-	50m
Feb-2017	Quatro Composites	AIM Aerospace	-	-	-
Feb-2016	Liberty Hall Capital Partners	AIM Aerospace	-	-	220m
Jan-2016	Precision Castparts Corp.	Berkshire Hathaway	13.9x	3.7x	36.9bn

Spotlight: The Boeing Company

HQ: Chicago, Illinois
Founded: 1916
Employees: 140,800
Enterprise value: US$206 billion
Market cap: US$204 billion
Revenue: US$96.9 billion
EBITDA: US$12.6 billion

Renton facility

Boeing's facility in Renton, WA — a mere 15 minutes outside of Seattle — is responsible for producing the Boeing B737. Other aircraft produced at the factory have included the B707, B727 and B757. The facility covers more than one million square feet, has two final assembly lines and is capable of producing more than forty airplanes per month.

Everett facility

Boeing's operations in Everett consisted of two separate production facilities. In 2016, Boeing opened a composite wing assembly site for the B777X that is considered the sixth largest building, by volume, in the world. However, the wing facility is dwarfed by the Boeing Everett Factory, which is considered the largest building in the world. The factory produces the B747, B767, B777 and B787 airplanes.

SOUTHERN CALIFORNIA

Southern California has a rich history of prominence in the aerospace industry. During the Cold War, 15 of the 25 largest aerospace companies in the USA were based in Southern California. Douglas Aircraft, the Aerospace Corporation, Rockwell, Lockheed, Northrop and Hughes Aerospace all had operations in Southern California's growing aerospace hub. The defense industry also grew as the navy and the marines took hold in San Diego military bases, like Camp Pendleton and Point Loma. As the USA ramped up its lunar program, Southern California became a profitable space hub for new technologies and space systems. Southern California's A&D industry saw sharp declines in output nearing the turn of the century, but the rise of new ventures such as SpaceX has reignited Southern California's entrepreneurial A&D growth. Companies such as Cubic, Lockheed Martin, Boeing, Northrop Grumman, Raytheon and General Atomics now create most of the traction in the region, with a large variety of aerostructure and space specialization. With such a rich history and large diversity of specialization, Southern California enjoys an active M&A market, as larger companies look to outsource growth and smaller companies flourish with regional customer bases and supply chain integration.

Selected company profiles

Boeing Engineering, Test & Technology	• Employees: 19,000 • Headquarters: Huntington Beach, CA • Overview: Boeing ET&T supports Boeing's business units through IT, R&D, test and evaluation
Cubic	• Revenue: US$1.6 billion • Employees: 8,700 • Headquarters: San Diego, CA • Overview: Cubic provides mission solutions and global defense solutions to defense markets
Northrop Grumman Aerospace Systems	• Employees: 23,000 • Headquarters: Redondo Beach, CA • Overview: Designs and makes aircraft, spacecraft lasers and other systems and subsystems
Skunk Works	• Headquarters: Palmdale, CA • Overview: Lockheed Martin Aeronautics' Skunk Works develops special-purpose high-tech aircraft and other advanced government projects • Works on B-2 Spirit, F-22 Raptor, F-35 Lightning
Teledyne Technologies	• Revenue: US$2.8 billion • Employees: 10,340 • Headquarters: Thousand Oaks, CA • Overview: Produces A&D electronics, engineered systems, instrumentation and digital imaging
Viasat	• Revenue: US$1.5 billion • Employees: 5,200 • Headquarters: Carlsbad, CA • Overview: Provides high-speed satellite broadband solutions for military and commercial markets

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Apr-2018	Certified Thermoplastics Inc.	Ducommun	-	-	30.5m
Mar-2018	Microsemi Corp.	Microchip Technology	18.1x	5.5x	10.1bn
Sep-2017	Lightning Diversion Systems	Ducommun	-	-	60m
Dec-2016	e2v Technologies	Teledyne Technologies	12.6x	2.7x	783m
Nov-2016	Aerodocs Limited	Viasat Inc.	-	-	-
Feb-2016	Miltec Corp.	General Atomics	-	0.5x	14.6m

Spotlight: SpaceX

Employees: 6,000
Headquarters: Hawthorne, CA

SpaceX is a privatized space services and aerospace manufacturer, founded by Elon Musk. SpaceX designs, manufactures and launches liquid-propellant rockets, rocket engines and ballistic capsules for commercial and government uses. SpaceX is the world's fastest growing provider of launch services, with the ultimate goal of interplanetary travel.

Spotlight: General Atomics

Employees: 11,000
Headquarters: San Diego, CA

General Atomics develops technology solutions for energy, environmental and defense applications. Solutions range from the nuclear fuel cycle to electromagnetic systems, remotely operated surveillance aircraft, airborne sensors and advanced electronic, wireless and laser technologies.

FORT WORTH, TEXAS

Fort Worth is known for A&D activity, as it headquarters two international airlines and many major OEM operations. L3 Technologies, Lockheed Martin, BAE Systems, Raytheon, Honeywell, General Dynamics, UTC, Bombardier, BBA, Gulfstream, Rockwell Collins, Boeing, Pratt & Whitney, Zodiac, Triumph, DRS Technologies, StandardAero and Airbus Helicopter have major operations in the area.

The selected companies have corporate headquarters in the area, as well as major production operations. A highly skilled workforce bolsters the state's impressive A&D growth: Texas leads the nation in skilled aerospace occupants, ranking in the top three in aircraft mechanics, aerospace engineers, avionics technicians, aircraft and engine assemblers, as well as commercial pilots.

Selected company profiles

Bell Helicopter	• Revenue: US$3.3 billion • Employees: 6,500 • Headquarters: Fort Worth, TX • Overview: Manufactures commercial and military helicopters and parts. Fort Worth produces military vertical lift aircraft
Elbit Systems of America	• Revenue: US$615 million • Employees: 1,905 • Headquarters: Fort Worth, TX • Overview: Provides various systems for aviation, defense and security markets. It offers aircraft, vision, display and data systems
Lockheed Martin Aeronautics	• Revenue: N/A • Employees: 25,000 • Headquarters: Fort Worth, TX • Overview: Designs and manufactures military aircraft such as F-35, F-16, F/A-22, C-130, C-5 and F-117

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
May-2018	KLX Inc.	Aviall Inc. (Boeing)	15.7x	2.5x	4.2bn
Mar-2018	Universal Avionics	Elbit Systems	-	-	120m
May-2013	CSC Applied Technologies	Pacific Architects	-	-	175m
Mar-2013	Mustang Technology	L-3 Communications	-	-	54m

TUCSON, ARIZONA

Tucson is a premier aerospace hub in the USA, as two of the three largest employers in the city are defense related. Raytheon Missile Systems is headquartered in Tucson and employs over 10,000 people, second only to the University of Arizona. Raytheon's influence, paired with the presence of the Davis-Monthan Air Force Base, has served as the foundation for other companies, such as Lockheed Martin, to enter the city in a joint venture with Raytheon that is led by Raytheon. While not located directly in Tucson, the local aerospace ecosystem is significantly bolstered by other large players, including Honeywell Aerospace, which is headquartered in Phoenix.

Selected company profiles

Raytheon Missile Systems	• Revenue: US$7.79 billion • Employees: 10,300 • Overview: Raytheon Missile Systems, which is responsible for 30% of the firm's revenue, is headquartered in Tucson
Bombardier Tucson Facility	• Revenue: US$16.6 billion • Employees: 984 • Overview: Bombardier operates a Tucson service center that provides services across various different Bombardier platforms
Honeywell Aerospace	• Revenue: US$14.8 billion • Employees: 6,247 • Overview: Honeywell Aerospace is a premier tier-one supplier to both OEMs and defense primes, and is headquartered in Phoenix

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
May-2018	IOTA Engineering	Acuity Brands	-	-	-
Mar-2018	Universal Avionics Systems	Elbit Systems	-	-	120m
Jan-2015	Sensintel Inc.	Raytheon Missile Systems	-	-	-
Jun-2011	Ktech Corporation	Raytheon Missile Systems	-	0.8x	51m

CINCINNATI, OHIO

The greater Cincinnati area played a large part in the history of aerospace, as the Wright brothers came from nearby Dayton, Ohio. However, as time has progressed, the aerospace industry within Cincinnati has also developed to meet the needs of today's market. The local aerospace industry is led by GE Aviation, a business segment that represents over US$25 billion in revenue. In addition to GE Aviation, there are over 300 industry-related support businesses, including Honeywell Electronics and Lighting, Ball Aerospace, L-3 Communications and many more.

Selected company profiles

GE Aviation	• Revenue: $27.4 billion • Employees: 4,500 • Overview: GE Aviation designs and produces commercial and military aircraft engines, integrated digital components, electric power and mechanical aircraft systems
Xetron Corporation (Northrop Grumman)	• Revenue: N/A • Employees: 550 • Overview: Xetron, a subsidiary of Northrop Grumman, is a government contractor specializing in computer surveillance and security software
UTC Aerospace Systems (Land Systems Division)	• Revenue: N/A • Employees: 700 • Overview: UTC Aerospace Systems operates its Landing Systems Division out of the greater Cincinnati area and was formerly a part of Goodrich

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Mar-2017	Critical Technologies	GE Aviation	-	-	14m
Nov-2016	GE Aviation, Avionics Business	Ontic Engineering and Manufacturing	-	-	62m
Jan-2016	Convergence Fuel Systems (50%)	GE Aviation	-	-	573m
May-2014	GE Aviation, Hydraulic Actuation Business	Triumph Aerospace Systems	-	-	70m

CLEVELAND, OHIO

The Cleveland aerospace market is largely shaped by three major companies with strong presences in Cleveland: Eaton, Parker Hannifin and the TransDigm group. All three companies offer various products to both OEMs and defense prime contractors. Similar to many other major aerospace markets, there are many smaller companies that have either developed in Cleveland or gone there to support these companies. Despite having its headquarters in Cleveland, TransDigm's business model is very decentralized and many of the employees are not actually located there. However, there are other major influencers of the aerospace market in the city, such as NASA's Glenn Research Center. The NASA Glenn Research Center is a major NASA field center, whose primary purpose is to develop science and technology for aeronautics and space. Due to the efforts of NASA, Parker, Eaton and other firms, Cleveland has effectively established itself as a premier aerospace market within the USA.

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Jan-2018	Nelson Fastener Systems	Stanley Black & Decker	-	2.2x	440m
Jan-2017	Avtron Aerospace	Odyssey Investment Partners	-	-	-
Apr-2014	Pexco Aerospace	TransDigm	-	-	336m
Sep-2014	HDT Global	Charlesbank Capital Partners	-	-	-
Oct-2012	Goodrich Electric Power Systems	Safran SA	-	-	404m

Spotlight: TransDigm Group

Revenue: US$3.60 billion
Employees: 6,000
Headquarters: Cleveland, OH

TransDigm is a supplier of highly engineered aircraft components and subsystems that emphasizes proprietary aerospace products with significant aftermarket opportunities. Much of TransDigm's growth has occurred inorganically through acquisition, as proven by their 15 acquisitions in the last five years.

Spotlight: Parker

Revenue: US$13.98 billion
Employees: 56,690
Headquarters: Cleveland, OH

Parker Hannifin operates in six groups, with aerospace products ranging from flight control actuation to lubrication systems. Parker's Aerospace Systems Division is responsible for almost 20% of the company's total revenue. Parker completed a US$4 billion acquisition of CLARCOR, a manufacturer of filtration products, in February 2017.

Spotlight: Eaton

Revenue: US$20.81 billion
Employees: 96,000
Headquarters: Dublin, Ireland

Eaton utilizes power management technology across several industries. Major products within Eaton's Aerospace Division include aerospace fuel, hydraulics and pneumatic systems. Aerospace sales account for approximately 9% of the company's total revenue.

INDIANAPOLIS, INDIANA

The city of Indianapolis is a significant player in the US aerospace market, as it hosts major companies — most notably the largest manufacturing plant of Rolls-Royce in North America. Rolls-Royce is the 25th largest employer in the state of Indiana, occupying nearly 3.5 million square feet in the Indianapolis area. In addition to Rolls-Royce, several major companies are in nearby Fort Wayne, Indiana, including Raytheon and BAE Systems.

Selected company profiles

Rolls-Royce North America	• Revenue: US$5.9 billion • Employees: 4,200 • Overview: Rolls-Royce North America manufactures aircraft engine and power systems
Raytheon Indianapolis Facility	• Revenue: N/A • Employees: 2,500 • Overview: Raytheon's facility in Indianapolis develops electronic warfare systems for soldiers and weapon systems for the U.S. military and allies
BAE Systems Fort Wayne, Indiana Facility	• Revenue: N/A • Employees: 883 • Overview: Fort Wayne, Indiana site supports the Controls and Avionics Solutions segment providing flight and engine control systems

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Jan-2018	GCR Inc.	Hammond, Kennedy, Whitney & Company	-	-	124m
Aug-2013	Piezotech LLC	Meggitt S.A.	-	-	41m
Feb-2008	MTI PolyFab Inc.	Aero Technologies LLC	-	-	25m
Nov-2007	Avborne Heavy Maintenance Inc. and Aviation Maintenance Staffing Inc.	AAR Aircraft Services Inc.	-	-	70m
Nov-2007	Haverstick Consulting	Kratos Defense & Security Solutions	-	-	89m

ST. LOUIS, MISSOURI

St. Louis has a history of aerospace prominence because it is the home of McDonnell Douglas: one of the largest aerospace companies, with major operations in the St. Louis area, it allowed the city to flourish with talent and opportunity. Since McDonnell Douglas merged with Boeing, many other companies have thrived in the area, such as Boeing Defense Systems, DRS Land Systems, LMI Aerospace and others. The established aerospace infrastructure, coupled with a highly talented professional pipeline, has led to successful growth opportunities for companies. M&A activity has been restricted to the large transactions of well-established companies looking to expand market share or improve their supply chain.

Selected company profiles

Boeing Defense, Space & Security (BDS)	• Revenue: US$21.1 billion • Overview: Headquarter in St. Louis, MO, BDS develops and produces manned and unmanned military aircraft and weapons systems for the U.S. DoD, foreign militaries and NASA.
Leonardo DRS Land Systems	• Employees: 1,500 • Headquarters: St. Louis, MO • Overview: Leonardo DRS Land Systems integrates a variety of systems in ground vehicles for recon, surveillance, mission support and lethality
LMI Aerospace	• Revenue: US$346 million • Employees: 1,651 • Headquarters: St. Charles, MO • Overview: LMI manufactures aluminum, specialty alloy and composite components and structural assembles for aircraft

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Feb-2017	LMI Aerospace	Sonaca S.A.	12.5x	1.2x	432m
May-2016	Herndon Aerospace & Defense	KLX Inc.	10.9x	1.7x	222m
Dec-2012	Valent Aerostructures	LMI Aerospace	21.6x	2.8x	287m

WICHITA, KANSAS

Wichita, Kansas, has been called the Air Capital of the World since its inception as an aerospace hub in the early 1900s. Early entrepreneurs flocked there to start future aerospace powerhouses, such as Beechcraft, Cessna and Learjet. Over the following few decades, aviation and aircraft manufacturing drove Wichita's expansion and, with it, a flow of driven and experienced engineers who would shape the aviation industry. In 1934, Boeing acquired Stearman's production facilities in Wichita and quickly scaled to become one of Wichita's largest and most profitable employers.

Today, the civil operations of Stearman is part of Spirit AeroSystems. During World War II, the Boeing facilities were used by the army as Boeing Airplane Company Plant No. 1, famous for its production of the Boeing B-29 Bombers. The majority of the original companies founded in the city remain there. Many production facilities are focused on large aerostructure manufacturing, such as Boeing and Airbus platforms. The Department of Commerce has estimated that around 250,000 aircraft have been manufactured in Wichita, with significant potential for growth.

Selected company profiles

Airbus	• Airbus operates an engineering and design center in Wichita State University's Innovation Campus • Over 400 employees covering all Airbus commercial aircraft, including significant design work on the next-generation A350 XWB
Beechcraft	• Aircraft manufacturer founded in Wichita, 1932 • The Beechcraft Bonanza platform has the longest production run of any airplane • Acquired by Textron in 2013 to be merged with Cessna
Cessna	• Founded in 1927 in Wichita • Manufactured over 100,000 single-engine planes over its 90-year history • Merged with Cessna after being acquired by Textron in 2013
Garmin	• Garmin produces navigation, communication and information products in auto and aviation • Headquarters in Olathe, Kansas • Employs 12,300 people
Learjet	• Formed in Wichita as the first commercial manufacturer of private luxury planes • Over 3,000 aircraft manufactured • Acquired by Bombardier to collaborate on business aircraft production

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Jul-2018	Perfekta	Cadence Aerospace	-	-	-
May-2018	3P Processing	Spell Capital	-	-	-
Nov-2017	F.M.I.	AE Industrial	-	-	-
Oct-2016	Paradigm Machine	MAX Aerostructures	-	-	-
Jul-2016	ZTM	Accurus	-	-	-
Jan-2014	Lee Aerospace	Triumph Group	-	-	23m
Dec-2013	Beechcraft Corp.	Textron	-	0.3x	1.4bn
Jul-2013	Exacta Aerospace	Precision Castparts	-	-	-

Spotlight: Spirit AeroSystems

Revenue: US$7.0 billion
Employees: 15,500
Headquarters: Wichita, KS

Premier aerosystem manufacturer, focusing on fuselage and cockpit structures for Boeing and Airbus. Boeing accounts for 90% of sales, with large service contracts on the 737, 747, 767, 777, 787 and the P-8A.

Spirit AeroSystems recently acquired Belgian aerostructure manufacturer S.R.I.F. NV (the parent of Asco Industries) in May for US$650 million.

BOSTON, MASSACHUSETTS

Boston's A&D hub is directly linked to the highly engineered intellectual property and top-tier talent pool that feeds into the area. Technically progressive component and cybersecurity companies make up a large portion of the A&D economy. The strong technical workforce provides a constant innovation and growth pattern for the A&D industry. Boston's own Massachusetts Institute of Technology is the number-one ranked aerospace engineering program, graduating over 5,000 highly qualified professionals into the workforce every year. This local powerhouse of talent has greatly increased the opportunity available to compete on a technical qualitative level with the rest of the world. Companies headquartered in Boston, such as Raytheon, Mercury and QinetiQ, compete on technological advances and research and development (R&D) pipelines. Companies such as BAE Systems, Lockheed Martin, AMETEK, General Dynamic, L-3 Technologies and UTC Aerospace all have significant operations in Boston, due to the technology hub and opportunity for growth it offers. M&A activity is greatly dependent on technological advances, as many companies acquire in order to keep up with technology trends and growth opportunities.

Selected company profiles

General Dynamics Mission Systems	• Headquarters: Taunton, Dedham, MA • 4 locations In Boston area, including cyber & electronic warfare, ground systems, C4ISR technology and maritime systems
Astrodyne TDI	• Revenue: US$142 million • Employees: 2,400 • Headquarters: Mansfield, MA • Overview: Develops and manufactures power solutions for various applications
CIRCOR	• Revenue: US$792 million • Employees: 4,400 • Headquarters: Burlington, MA • Overview: Circor's Advanced Flow Solutions segment makes control valves for aircraft manufactures
QinetiQ	• Employees: 2,630 • Headquarters: Waltham, MA • Overview: Produces vehicle and soldier protection, unmanned systems, power sensors, control systems and transportation solutions
Mercury Systems	• Revenue: US$493 million • Employees: 1,300 • Headquarters: Andover, MA • Overview: Provides safety critical mission processing subsystems for defense programs

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Nov-2017	Astrodyne TDI	Tinicum L.P.	-	-	-
Feb-2016	Bluefin Robotics	General Dynamics Mission Systems	-	-	-
Jun-2014	Hittite Microwave	Analog Devices, Inc.	14.9x	6.5x	2.4bn
Sep-2009	BBN Technologies Corp.	Raytheon Network Centric Systems	-	-	330m

Spotlight: Raytheon

Revenue: US$26.5 billion
Employees: 64,000
Headquarters: Waltham, MA

The Raytheon Company designs and manufactures integrated products, services and solutions for defense and government markets worldwide. Raytheon operates through four main divisions: Missile Systems, Integrated Defense Systems, Intelligence, Information and Services, and Forcepoint.

Transaction highlight: In April of 2015, the Raytheon Company announced the acquisition of Websense, Inc. for a purchase price of US$1.89 billion. Websense provides data security solutions for cyber threats, malware attacks and data leaks. The acquisition bolsters Raytheon's already strong security platform and is assumed to bring cost-cutting synergies to the newly named Forcepoint segment of Raytheon. Raytheon CEO Thomas Kennedy stated, "An exponential increase in the number of attacks by ultra-sophisticated attackers [...] is leading to an explosion in the cybersecurity area."

NEW YORK, NEW YORK

New York City is considered a corporate hub for most industries' headquarters. The A&D industry has a long history of relevance as Grumman Corporation, now merged and known as Northrop Grumman, was once the largest employer on all of Long Island. Their production facility for early prototypes occupied over 6,000,000 square feet and employed 23,000 people at its peak. It has since been dissolved, but New York's aerospace relevancy deals mostly with the corporation's financial prowess and corporate hub. An active M&A landscape has been localized due to the corporate headquarters' locations in New York, while most operations are outsourced to cheaper labor and production facilities.

Selected company profiles

Crane	• Revenue: US$2.9 billion • Employees: 10,600 • Headquarters: Stamford, CT • Overview: Aerospace and electronics segment creates original industrial equipment for various A&D applications
L3 Technologies	• Revenue: US$9.6 billion • Employees: 31,000 • Headquarters: New York, NY • Overview: Manufactures aerospace systems and communication, electronic and sensor systems for military and commercial markets
Telephonics	• Revenue: US$412 million • Employees: 1,087 • Headquarters: Farmingdale, NY • Overview: Develops surveillance, communications and integration services for A&D and commercial market

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Oct-2018	L3 Technologies	Harris Corporation	13.1x	1.8x	18.9bn
Mar-2018	Triumph Structures-Long Island& Co. Inc.	Aero Structures Long Island	-	-	-
Mar-2018	Aerospace Holdings	Harlow Aerostructures	-	-	16m
Nov-2016	Data Device Corporation	TransDigm	-	-	1.0bn
Nov-2016	Arkwin Industries	TransDigm	-	3.0x	286m

WASHINGTON, D.C.

Washington, D.C. is a military hub for specialty defense technology, mission systems and specialized aerostructures. The US Department of Defense, headquartered in Washington D.C., provides a foundation for the A&D industry to thrive. The largest defense contractors in the world reside in Washington, due to the natural military hub formed by years of government expansion. With hundreds of billions of dollars being spent each year through government contracts, A&D companies are forced to outcompete each other with the best military solutions. With the headquarters of the air force — as well as the navy and army — in D.C., various subsectors of the A&D industry thrive, such as military intelligence solutions, defense technology, mission systems, IT systems and large aerostructure manufacturing. Major players in the industry are Lockheed Martin, Northrop Grumman and Booz Allen Hamilton. As military spending is expected to increase, high technology costs and the increased demand for military solutions will cause a surge of opportunity for companies located in Washington D.C.

Selected company profiles

General Dynamics	• GD is the fourth largest defense contractor, focusing on military vehicles
Leidos	• Defense intelligence contractor for DoD with specialties in IT capabilities
BAE Systems North America	• BAE Systems North America supplies large structural defense support for USA
ManTech International	• ManTech is a leader in cybersecurity, enterprise IT, data collection and analytics
CSRA	• CSRA provides information technology services for national security applications
Booz Allen	• Largest defense & intelligence contractor • 24,600 employees, US$6.4 billion revenue

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Mar-2018	SC3 LLC	General Dynamics	-	-	-
Feb-2018	CSRA Inc.	General Dynamics	11.7x	1.9x	9.9bn
Oct-2017	Morphick Inc.	Booz Allen Hamilton	-	-	-
Oct-2017	Praxis Engineering Tech	CSRA Inc.	-	-	235m
Sep-2017	InfoZen	ManTech	-	-	180m
Sep-2017	Orbital ATK, Inc.	Northrop Grumman	15.4x	2.1x	9.4bn
Feb-2017	IAP Research, Inc.	BAE Systems, Inc.	-	-	-
Nov-2016	eGov Holdings	Booz Allen Hamilton	-	-	250m
Oct-2016	AWE Management	Lockheed Martin	-	-	-
Jun-2016	Oceans Edge	ManTech	-	-	47bn
Jan-2016	Colshire Drive	Northrop Grumman	-	-	160m
Jan-2016	Lockheed Martin Info Systems	Leidos Inc.	-	-	5bn
Jul-2015	Sikorsky Aircraft	Lockheed Martin	24.9x	1.4x	9bn
Feb-2015	ARMA Global	General Dynamics	-	-	-
Jul-2014	Signal Innovations	BAE Systems, Inc.	-	-	21m

Spotlight: Lockheed Martin

Revenue: US$54.3 billion
Employees: 100,000
Headquarters: Bethesda, MD

LOCKHEED MARTIN

Lockheed Martin is the world's largest defense contractor with four main divisions: Missiles and Fire Control, Rotary and Mission Systems, Aeronautics, and Space Systems.

Spotlight: Northrop Grumman

Revenue: US$28.3 billion
Employees: 70,000
Headquarters: Falls Church, VA

NORTHROP GRUMMAN

Northrop Grumman is a large defense contractor that specializes in mission systems, technology systems and aerospace manufacturing. Northrop Grumman mostly services the US Department of Defense.

CHARLESTON, SOUTH CAROLINA

South Carolina is quickly becoming a premier aerospace hub, with Charleston leading the state's efforts. The state has seen both employment and revenue grow by 15.5% over a three-year period. Also, within the state of South Carolina, employee growth within the aerospace industry has been 8x higher than the state-wide average since 2010. This burgeoning marketplace is led by Boeing and includes other blue-chip firms, such as Lockheed Martin, GE Aviation, Eaton, Parker and Safran. Over 70% of aerospace jobs are in aerospace manufacturing.

Selected company profiles

Boeing South Carolina	• Revenue: N/A • Employees: 7,000 • Overview: Boeing manufactures major Boeing 787 aircraft components, in addition to performing the final assembly and delivery of the Boeing 787
Lockheed Martin Greenville Operations	• Revenue: N/A • Employees: 550 • Overview: Lockheed Martin's operations in Greenville provide MRO services for military and civil aircraft in addition to manufacturing the T-50A
Safran Electrical & Power Division	• Revenue: N/A • Employees: 150 • Overview: Safran's Electrical and Power Division operates in Charleston to support wiring and landing gear activities for the Boeing 787

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Jan-2017	Advanced Technology International	Analytic Services Inc.	-	-	40m
Apr-2014	UEC Electronics, LLC	Arotech Corporation	6.9x	1.2x	40m
Nov-2011	Force Protection Inc.	General Dynamics Land Systems	11.9x	0.4x	238m
Jul-2009	Vought Aircraft Industries	Boeing	-	-	997m

HARTFORD, CONNECTICUT

Hartford, Connecticut's A&D hub revolves around highly engineered components, subsystems and systems. Hartford is home to world leaders in everything from connectivity products to turbofan jet engines, as it enjoys a highly trained workforce and a strong ecosystem of suppliers and manufacturers. Hartford's A&D industry feeds off Pratt & Whitney's presence in the area. Pratt & Whitney, a United Technologies subsidiary, supports a whole supply chain for large turbofan jet engines. Their long-standing roots in the area have established a regional supply chain of highly engineered components. In addition to the aerospace engine industry, Hartford and its surrounding cities have large operations in interconnectivity products, specialized components and helicopter production. Hartford has benefited from an active M&A market, as many large, international companies based out of the area look to outsource organic growth and pursue growth opportunities in other markets and geographies. Expect many first- and second-tier suppliers to consolidate to gain more pricing leverage in response to Boeing and Airbus' efforts to cut margins and boost returns through supply chain pressure.

Selected company profiles

Amphenol	• Revenue: US$7.9 billion • Employees: 70,000 • Headquarters: Wallingford, CT • Overview: Largest manufacturer of interconnect products in A&D market
Barnes Aerospace	• Employees: 5,400 • Headquarters: Windsor, CT • Overview: Produces precision components for OEM turbine, airframe and gas turbine builders
Kaman	• Revenue: US$1.8 billion • Employees: 5,297 • Headquarters: Bloomfield, CT • Overview: Makes proprietary aircraft bearings and various electro-mechanical products
Sikorsky	• Revenue: US$6.4 billion • Employees: 8,750 • Headquarters: Stratford, CT • Overview: Manufactures and services military and commercial helicopters and aircraft
Textron	• Revenue: US$14.3 billion • Employees: 37,000 • Headquarters: Providence, RI • Overview: Aviation segment manufactures and sells business, turboprop and piston aircraft

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Sep-2017	Rockwell Collins	United Technologies	14.4x	3.5x	30.9bn
Jul-2017	Meggitt (Maryland) and Piezotech LLC	Amphenol Corp.	16.4x	1.6x	111m
Dec-2016	Phitek Limited	Amphenol Corp.	-	2.7x	42.9m
Mar-2016	Airborne Tactical Advantage	Textron Inc.	-	-	-
Jul-2015	Sikorsky Aircraft	Lockheed Martin	13.0x	1.2x	9.1bn

Spotlight: Pratt & Whitney

Revenue: US$16.16 billion
Employees: 38,737
Headquarters: East Hartford, CT

Pratt & Whitney
A United Technologies Company

Pratt & Whitney designs, manufactures, repairs and services large turbofan jet engines for commercial and military aircraft, as well as small gas turbine engines for business and regional jets. Pratt & Whitney is a subsidiary of United Technologies Corporation (UTC).

Transaction highlight: In September 2017, UTC announced the acquisition of Rockwell Collins for US$30 billion. The transaction created a new player in the top echelon of suppliers of Boeing, Airbus, Bombardier and other plane makers. The takeover gives UTC more leverage to resist pressure from plane makers seeking price cuts. Rockwell Collins' software capability also gave UTC an edge in the data crunching that allows airlines to spot problems in engines and other components before they fail.

HUNTSVILLE, ALABAMA

Huntsville is a key city for the US Defense market, largely due to the strong presence of the US Army in the city. The US Army's Redstone Arsenal is responsible for 41,500 jobs in Huntsville, nearly 25% of all employment. In order to compete for new defense contracts, major prime contractors, such as Boeing, Lockheed Martin, Northrop Grumman and Raytheon, all have operations in Huntsville. The primary point of emphasis for the defense industry in the city is missile technology. In addition to missiles, Huntsville is a key city in the development of rocket propulsion technology for the future. A large part of this can be traced to the presence of NASA's Marshall Space Flight Center, which has been tasked with developing the future Space Launch System. In addition to the Marshall Space Flight Center, Huntsville is home to the Cummings Research Park — one of the world's largest research parks, fostering a culture of innovation within the local A&D market.

Selected company profiles

Boeing (Multiple Divisions)	• Revenue: N/A • Huntsville employees: 2,600 • Core business segments: Integrated Air & Missile Defense program, strategic missile & defense systems and Boeing Global Services
Dynetics	• Revenue: US$315 million • Huntsville employees: 1,038 • Core business segments: Product development and engineering services for various defense systems, including strike systems and weapons technology
Lockheed Martin (Multiple Divisions)	• Revenue: N/A • Huntsville employees: 1,084 • Core business segments: Air and missile defense systems, command and control, battle management and communications products and services
Northrop Grumman (Multiple Divisions)	• Revenue: N/A • Huntsville employees: 1,200 • Core business segments: Missile defense and protective systems and Orbital ATK Flight Systems and Missile Products Divisions
Teledyne Brown Engineering	• Revenue: US$217 million • Huntsville employees: 794 • Core business segments: Ballistic missile defense systems engineering and technical assistance to the US Army

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
Nov-2016	Camber Corporation	Huntington Ingalls Industries	8.6x	1.0x	380m
Feb-2016	Miltec Corporation	General Atomics Corporation	-	0.5x	15m
Dec-2015	GATR Technologies	Cubic Corporation	-	-	233m
Sep-2015	Abaco Systems	Veritas Capital Fund Management	-	-	515m

Spotlight: Cummings Research Park

The Cummings Research Park is an integral part of the private aerospace defense sector. It is the second largest research park in the USA and is home to 125 aerospace companies in Huntsville. Key companies include Northrop, Lockheed, BAE and others.

Redstone Arsenal was opened in 1941 as a chemical weapons manufacturing facility but has since become a key part of the army's efforts in missile and rocket technologies. The arsenal spans 38,248 acres and serves as the headquarters of several different US Army divisions.

NASA Marshall Space Flight Center

The Marshall Space Flight Center is NASA's civilian rocketry and spacecraft propulsion research center. For over 50 years the center has developed revolutionary space technology, assisting in the Apollo Moon program and the International Space Station. The center operates with a US$2 billion budget and approximately 6,000 employees.

Mobile, Alabama

Alabama has played a large role in the US aerospace industry since the inception of the country's first civilian flight school. The school was opened in 1910 by the Wright Brothers, and over time Mobile has become the A&D capital of Alabama. The city has shown its commitment to growing the A&D industries through the development of both the city's docks and the Mobile Aeroplex at Brookley. In 2005, US$300 million was invested into expanding Mobile's Alabama State docks, which has allowed defense-oriented shipyards, such as Austal USA, to grow and expand. Ultimately, Mobile's position as a significant city in the American A&D market was established in 2012, when Airbus announced plans to invest US$600 million to build a US assembly line for the Airbus A320. With that announcement, other companies were drawn to Mobile and the aerospace market has expanded even further.

Spotlight: Mobile Aeroplex

Mobile Aeroplex at Brookley

The Aeroplex is the hub of the Mobile aerospace industry and has successfully partnered with 90 tenants, including well-respected organizations such as Airbus, Honeywell, Safran, Thales, Zodiac Aerospace and the US Army Reserve.

Spotlight: Airbus

HQ: Leiden, Netherlands
Founded: 2000
Employees: 129,442
Enterprise value: US$86.5 billion
Market cap: US$84.9 billion
Revenue: US$75.8 billion
EBITDA: US$5.8 billion

AIRBUS

History in Mobile

The relationship between Airbus and Mobile started in 2007, when Airbus opened the Airbus Engineering Center, and in 2015 Airbus opened its first US commercial aircraft production site in the city. This represented a significant investment, as the site is 53 acres and cost US$600 million. Currently, the facility produces the A319, A320 and A321, at a rate of 48 aircraft per year.

Future of Airbus in Mobile

Jeff Knittel, CEO of Airbus Americas, has indicated a desire to increase production in Mobile by 50%. As a result of the acquisition of the Bombardier C Series, Airbus plans to build a C series assembly line, representing a US$300 million investment, showing a significant commitment to operations in the city.

Miami, Florida

Miami, Florida, is the leading aerospace MRO center in the USA. Miami offers nose-to-tail maintenance services for domestic and international airlines. As a result, Miami has a rich supply chain and highly trained talent pool that benefits growth in the city. Florida is ranked number one in high-tech employment in the Southeast, and over 28,000 new science, technology, engineering and mathematics graduates enter the workforce every year. Many large market cap component companies have MRO subsidiaries or branches in Miami, namely HEICO, AMETEK and B/E Aerospace. In addition, larger engineered components — like engines, landing gear and hydraulics — round out the city's services to truly provide a full-service MRO stop for all airlines. Being an air transport hub of the Western Hemisphere, Florida is home to over 100 public use airports, which provide plenty of opportunity for MRO companies and service subsidiaries to flourish and add value to the industry. Many larger aerospace companies have looked to acquire smaller MRO service shops in order to create a pipeline for servicing their own products or expansion of their current support and service operations.

Selected company profiles

AAR Aircraft Services Miami	• Headquarters: Miami, FL • Overview: Provides aftermarket support and services for the commercial aviation, government and defense markets. Miami specializes in airframe and landing gear MRO
AMETEK MRO Florida (AMF)	• Employees: 850 • Headquarters: Miami, FL • Overview: AMETEK-owned Aero Components, Avtech Avionics and High Standard Aviation all operate MRO services in Miami
Harris	• Revenue: US$6.05 billion • Employees: 17,000 • Headquarters: Melbourne, FL • Overview: Provides technology solutions for mission-critical and commercial markets, operating through three segments: Communication Systems, Electronic Systems, and Space and Intelligence Systems
KLX	• Revenue: US$1.9 billion • Employees: 3,000 • Headquarters: Wellington, FL • Overview: Leading distributor of aerospace fasteners, consumables and logistics services

Selected recent M&A activity

Date	Target	Acquiror	TEV/ EBITDA	TEV/ Sales	TEV (US$)
May-2018	KLX Inc.	Aviall (Boeing)	15.7x	2.5x	4.2bn
Jan-2018	THG Corp.	KLX Inc.	-	-	-
Oct-2016	B/E Aerospace	Rockwell Collins	13.3x	2.8x	8.1bn
Feb-2015	Exelis Inc.	Harris Corporation	9.2x	1.4x	4.7bn
Apr-2014	EMTEQ Inc.	B/E Aerospace	-	3.1x	470m

Spotlight: HEICO

Revenue: US$1.7 billion
Employees: 5,100
Headquarters: Hollywood, FL

HEICO

Manufactures aerospace, defense and electronic related products. The Miami area houses HEICO's HQ as well as the component repair group, electronic technologies, flight support group, parts group, and repair group.

Spotlight: Rockwell Collins

Revenue: US$2.9 billion (B/E Aerospace)
Employees: 10,875
Headquarters: Wellington, FL

Rockwell Collins

Rockwell Collins Interior Systems, formerly B/E Aerospace, manufactures cabin interior products for commercial aircraft.

Acquisitions: Since April of 2017, B/E Aerospace operates under Rockwell Collins.

A selection of recent Oaklins A&D transactions

A&A
has been acquired by
ae Industrial Partners
M&A SELL-SIDE
Aerospace & Defense/Private Equity

Advatech Pacific
CROSS DOMAIN SOLUTIONS
has been acquired by
GENERAL DYNAMICS
Mission Systems
M&A SELL-SIDE
Aerospace & Defense

arconics
CONNECTING EVERYONE ONBOARD
has been acquired by
ViaSat
M&A SELL-SIDE
Aerospace & Defense/TMT

CEi
has been acquired by
KRATOS
DEFENSE & SECURITY SOLUTIONS
M&A SELL-SIDE
Aerospace & Defense

GE Aviation
has sold its Santa Ana operations to
ADMIRALTY PARTNERS, INC.
M&A SELL-SIDE
Aerospace & Defense

Thermal Structures Inc.
has been acquired by
HEICO
M&A SELL-SIDE
Aerospace & Defense

Honeywell
Lubrication & Scavenge Pumps business
has been acquired by
TRANSDIGM GROUP INC.
M&A SELL-SIDE
Aerospace & Defense

LIGHTNING DIVERSION SYSTEMS
has been acquired by
Ducommun
US$60m
M&A SELL-SIDE
Aerospace & Defense

Parker
Heat Exchangers, Cooling Systems, and Oil Reservoirs
has been acquired by
Triumph Group, Inc.
M&A SELL-SIDE
Aerospace & Defense

PPP PACIFIC PRECISION PRODUCTS
has been acquired by
ZODIAC AEROSPACE
M&A SELL-SIDE
Aerospace & Defense

SCALED COMPOSITES
has been acquired by
NORTHROP GRUMMAN
M&A SELL-SIDE
Aerospace & Defense

UMBRAGROUP
has acquired
THOMSON AEROSPACE & DEFENSE
from
MEGGITT
M&A BUY-SIDE
Aerospace & Defense

MEET OAKLINS, THE WORLD'S MOST EXPERIENCED MID-MARKET M&A ADVISOR

700 professionals | 60 offices | 40 countries | 5,000+ transactions | 15 sectors

Oaklins offers a comprehensive range of services

- M&A advisory (buy- and sell-side)
- Growth equity and equity capital markets advisory
- Debt advisory
- Corporate finance services

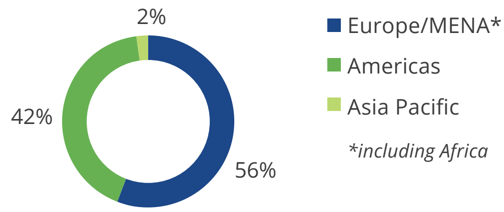
Our aerospace & defense transactions in the past five years

Closed deals

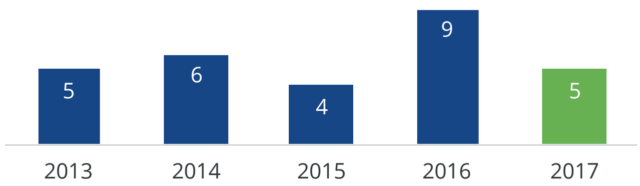
29 transactions closed 2013–2017

41% cross-border transactions

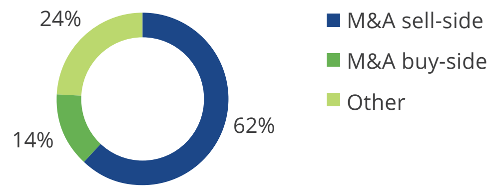
Geographic split in %



Number of transactions per year



Advisory role in %



Oaklins industry specialist

Aircraft systems is one of our focus areas. Combining comprehensive sector knowledge with global execution has led Oaklins to become the most experienced M&A advisor in the aircraft systems sector, with a large contact network of the most relevant market players worldwide. This results in the best possible merger, acquisition and divestment opportunities for aircraft systems companies.

If mergers, acquisitions or divestitures of businesses or business units are part of your strategy, we would welcome the opportunity to exchange ideas with you. Please find our contact details below.

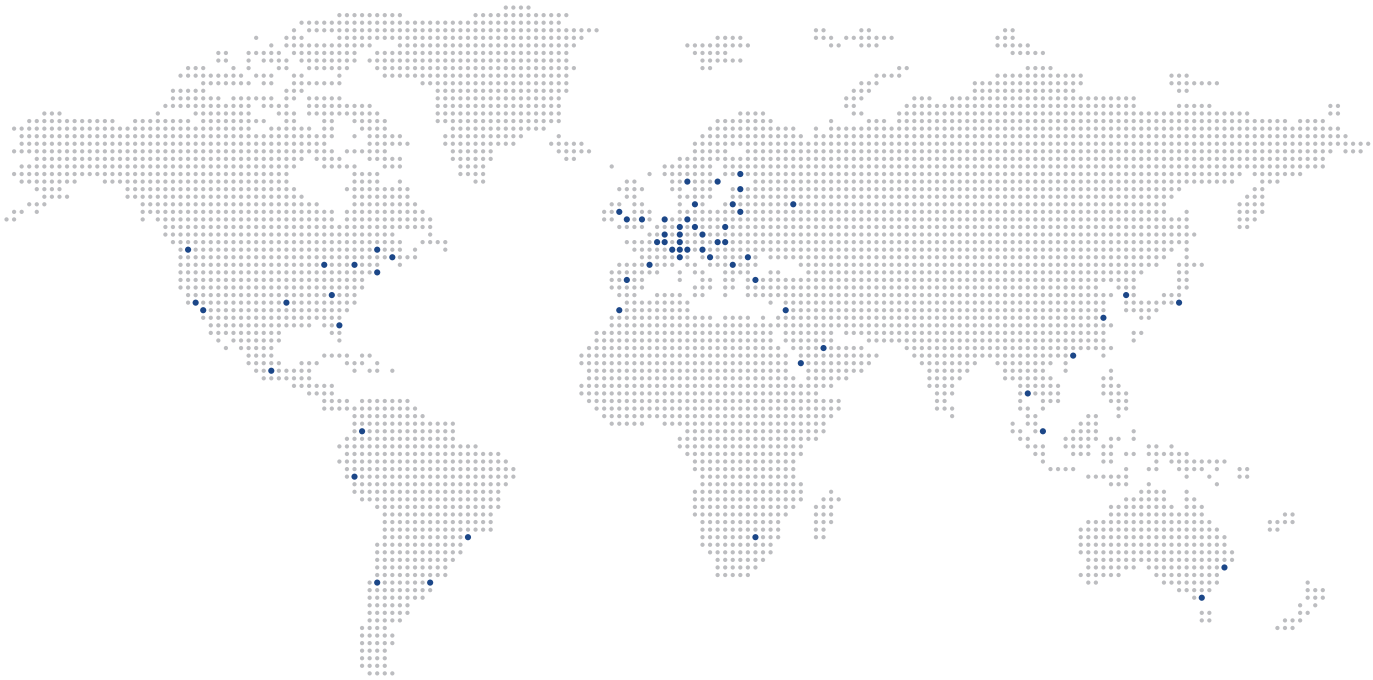
Stephen Perry, Managing Director
Irvine, USA

T: +1 949 769 3323

Jason Kimball, Director
Irvine, USA

T: +1 949 769 3323

Oaklins – our offices around the world



Disclaimer

This document is provided for information purposes only. Oaklins and its member firms make no guarantee, representation or warranty of any kind regarding the timeliness, accuracy or completeness of its content. This document is not intended to convey investment advice or solicit investments of any kind whatsoever. No investment decisions should be taken based on the contents and views expressed herein. Oaklins and its member firms shall not be responsible for any loss sustained by any person who relies on this publication.

Oaklins

www.oaklins.com