ASIAN SKY

Fleet Report

ASIA-PACIFIC REGION
CIVIL HELICOPTERS

YE 2020

SPECIAL FEATURES
COVID-19 IMPACT
UAM AND eVTOLs
OFFSHORE WIND MARKET

MARKET UPDATES
LEASING
EMS
OFFSHORE

PRODUCT SPOTLIGHTS & INTERVIEWS

BELL · JSSI · LCI · OceaniaAviation · PRATT & WHITNEY DEPENDABLE ENGINES GO BEYOND

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EDITOR'S NOTE

The old English phrase "No news is good news" does not really make a great deal of sense. Take bidding for an airline upgrade as an example. After making your bid, you are told that you will receive an email if your bid has been successful. If it is not, then you will never hear from the airline again. Nobody likes sharing bad news, and sadly this principle held true when it came to receiving answers to our Helicopter operator survey this year.

As part of the rigorous confirmation procedures we go through for all of our reports, we check, and then double check with operators the accuracy of the data that we have received from official sources. Our survey this year, asking operators to confirm their fleets at the end of 2020, received the fewest responses that we have ever received. However, that does not mean that the data presented is not accurate. Much of our data comes from official sources and asking operators to confirm their fleets is just one of the verification steps that we take.

Whilst researching and validating our data this year we uncovered an issue that, if left unchecked, could turn into a problem. We have seen in recent years a number of mega orders placed by operators and distributors in the region. Manufacturer's themselves have always been split on whether big orders are a good thing or not. On the one hand, it looks great to shareholders and helps fill out the orderbook, but on the other hand, there is always the possibility that not all of those helicopter orders will actually be delivered.

There is also the worry that, when those helicopters are delivered to distributors, the helicopters will sit around for several years waiting to be sold on to the end user. This is what seems to have happened recently in China. Whilst you might think that this would not bother the manufacturer – after all, it has delivered and been paid for the helicopter, the reality is that this can cause a lot of headaches. Part of that headache is because at some point, the distributor will have to do something with those helicopters. That often involves those helicopters being put on the market with a hefty reduction in asking prices. For manufacturers, this is bad as the helicopters for sale will be 'like new', with virtually no flight hours, so the manufacturers will be pitching against them whilst trying to sell new helicopters. For the market it is bad because it drives down the residual value of that type of helicopter. The market is very much supply and demand driven – the more supply there is, the lower the value of that supply.

Although the civil turbine helicopter fleet in Asia-Pacific grew by 1.8% in 2020, matching 2019's growth rate, it was not all good news, and as expected, COVID-19 had a big effect on the market. We have a special feature on the impact of the pandemic, in which we asked several operators, OEMS and leasing companies a short series of questions to see how the pandemic affected different types of companies.

Other special features in this edition include a feature on the offshore wind market, Urban Air Mobility & eVTOLs, and on maintenance cost programs – in which Mark Winzar of JSSI talks us through the benefits of enrolling on a program.

Elsewhere, Pratt & Whitney talks us though its commitment to Asia-Pacific, Bell explains why the Bell 505 is the perfect helicopter for the region, and New Zealand-based Oceania Aviation talks us through its maintenance offerings for both rotary and fixed-wing aircraft in Auckland. We also have interviews with helicopter lessor LCI - which explains why it has an advantage in the Asian market, Urban Air Mobility Pioneers Blade – which talks about the current issues and challenges in the UAM market, and eVTOL manufacturer EHang – which explains the role the eVTOLs will have in the UAM market, as well as updating us on its recent developments.

Last, but definitely not least, we have an article on Ascent – the Singapore-based UAM company that launched helicopter operations in both Bangkok and Manila.

Sincerely,
Alud Davies
Media & Communications Director, Asian Sky Group

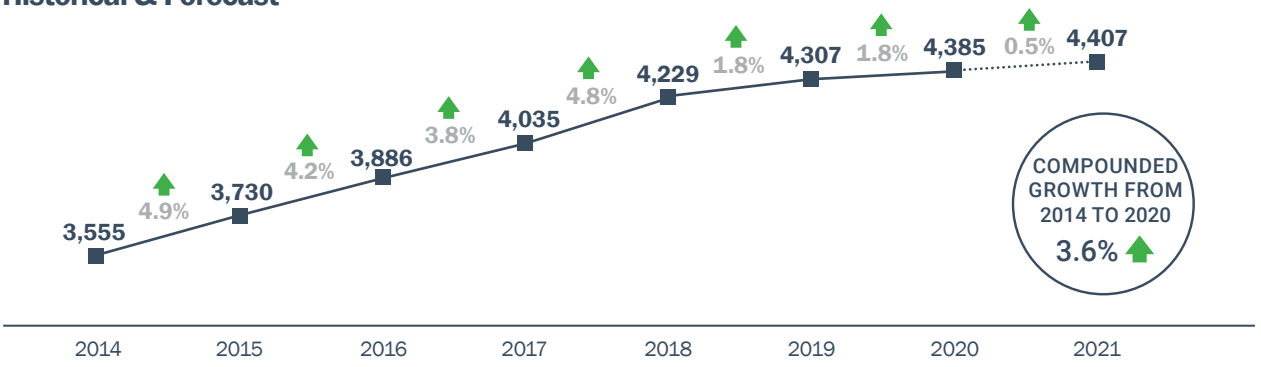
EXECUTIVE SUMMARY

THERE WERE A TOTAL OF 4,385 CIVIL TURBINE HELICOPTERS IN OPERATION IN THE ASIA-PACIFIC REGION AT THE END OF 2020. THE HELICOPTER FLEET GREW BY 78 UNITS IN 2020, A Y-O-Y GROWTH RATE OF 1.8% FROM THE 4,307 UNITS AT THE END OF 2019. THE REGION WITNESSED COMPOUND Y-O-Y GROWTH OF AROUND 3.6% SINCE 2014 WITH THE ADDITION OF 830 AIRCRAFT. THE DEMAND FOR HELICOPTERS, WHICH PEAKED IN 2018 BUT SHOWED SIGNS OF SLOWING IN 2019, FELL EVEN FURTHER IN 2020 AS THE COVID-19 PANDEMIC SWEPT THROUGH THE WORLD AND DERAILED THE GLOBAL ECONOMY. DESPITE THIS, THE FLEET IS EXPECTED TO CONTINUE GROWING IN 2021 AT A FORECASTED RATE OF 0.5%.

HELICOPTER FLEET GROWTH

Note: Historical fleet data is based on Asian Sky Group's adjusted and updated numbers.

Historical & Forecast



Overall, the region saw 304 fleet changes in 2020 - a drop from 385 in 2019. This was composed of 98 new deliveries and 93 pre-owned additions, as well as 113 deductions.

More than half (56%) of the Asia-Pacific turbine helicopter fleet were utility configured and used for multi-mission operations in 2020 - an increase of about 3.8% since 2019. The remaining fleet was dispersed among VIP (16%), law enforcement (7%), offshore (7%), SAR (6%), EMS (6%) and training (1%). Utility and VIP configured helicopters saw net additions, while EMS stayed the same as in 2019. Aside from the above, every other category saw a net deduction in 2020. The Offshore configured fleet experienced the largest reduction, by nine units, followed by Law Enforcement, SAR and Training configured helicopters – by eight, five and three units, respectively.

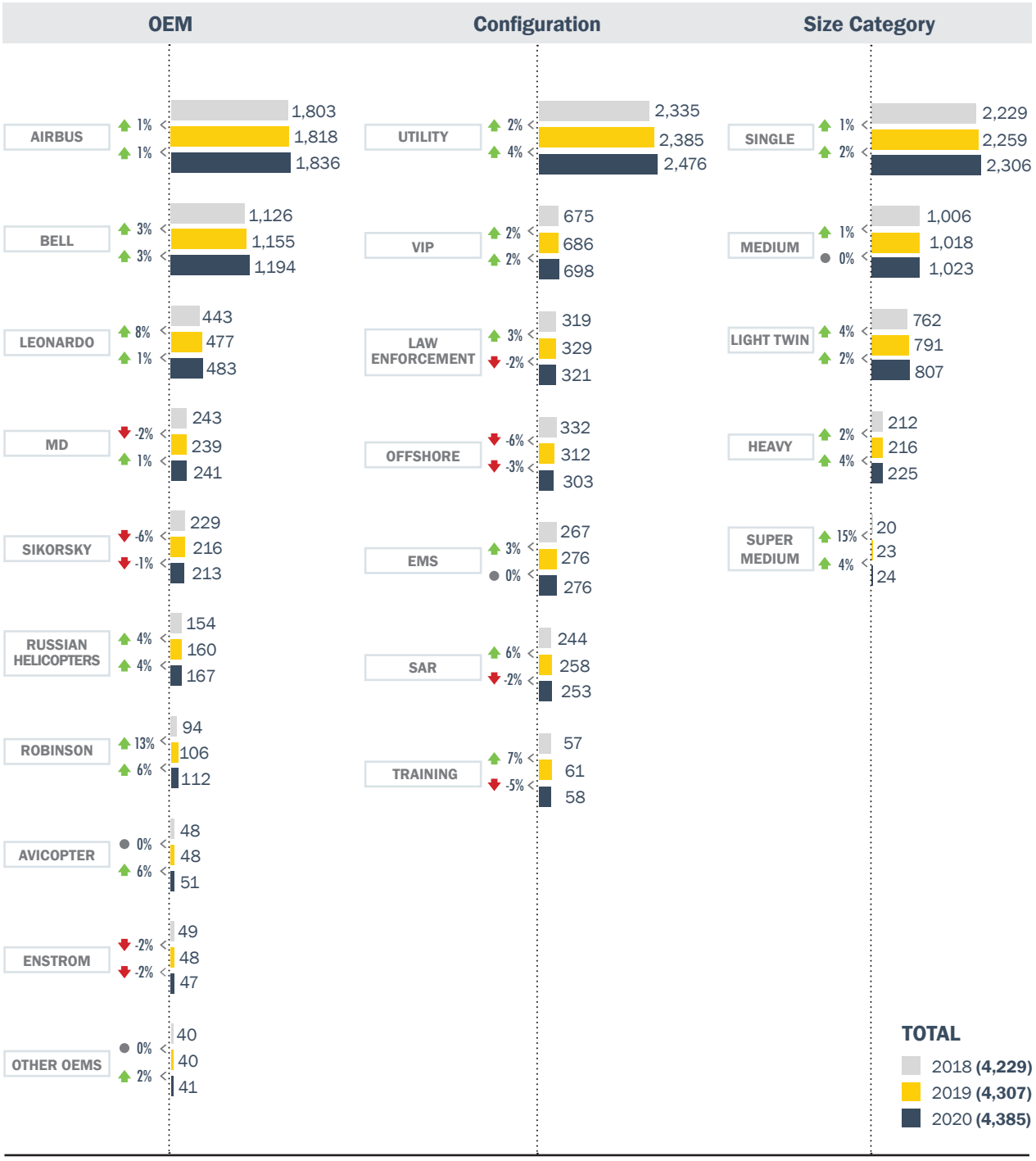
In terms of fleet value, utility configured helicopters accounted for nearly 45% of the total value of US$31.7 billion. It is worth mentioning that offshore and SAR configured helicopters were worth 16% and 10% of the total fleet value respectively, despite each accounting for less than 10% of the total fleet.

Airbus Helicopters (1,836 units), Bell (1,194) and Leonardo (483) remained the top three OEMs in the Asia-Pacific region with 42%, 27% and 11% market share, respectively. Bell and Airbus performed best in terms of net additions, with an increase of 39 units and 18 units since 2019. Sikorsky and Enstrom Helicopters saw net deductions, with three units and one unit over the same period.

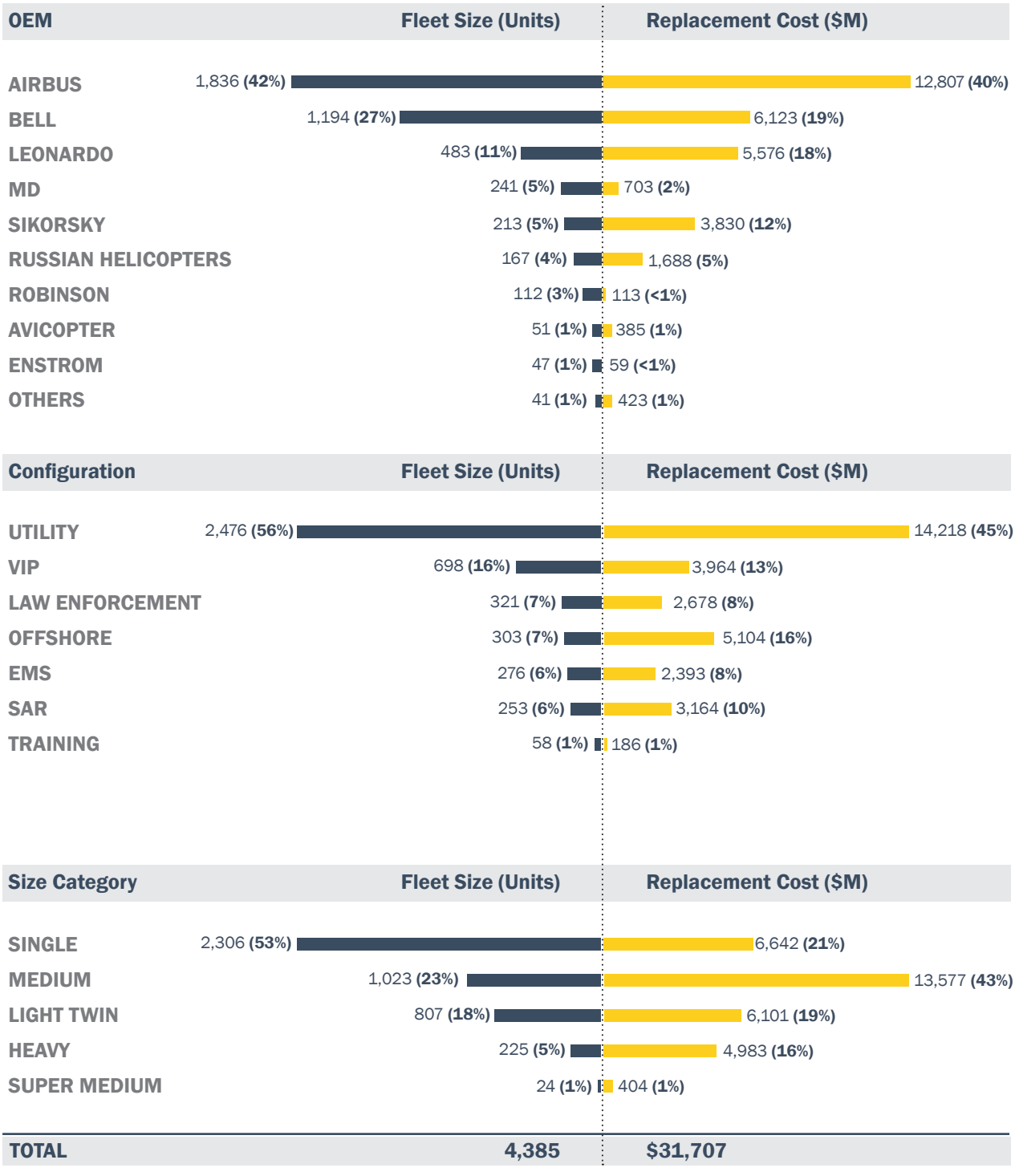
Single engine helicopters were the most popular in 2020, with more than half of the fleet (53%) belonging to the category. Medium size helicopters came next with a market share of 23%.

NET FLEET GROWTH

▲ Positive ▼ Negative ● No Change

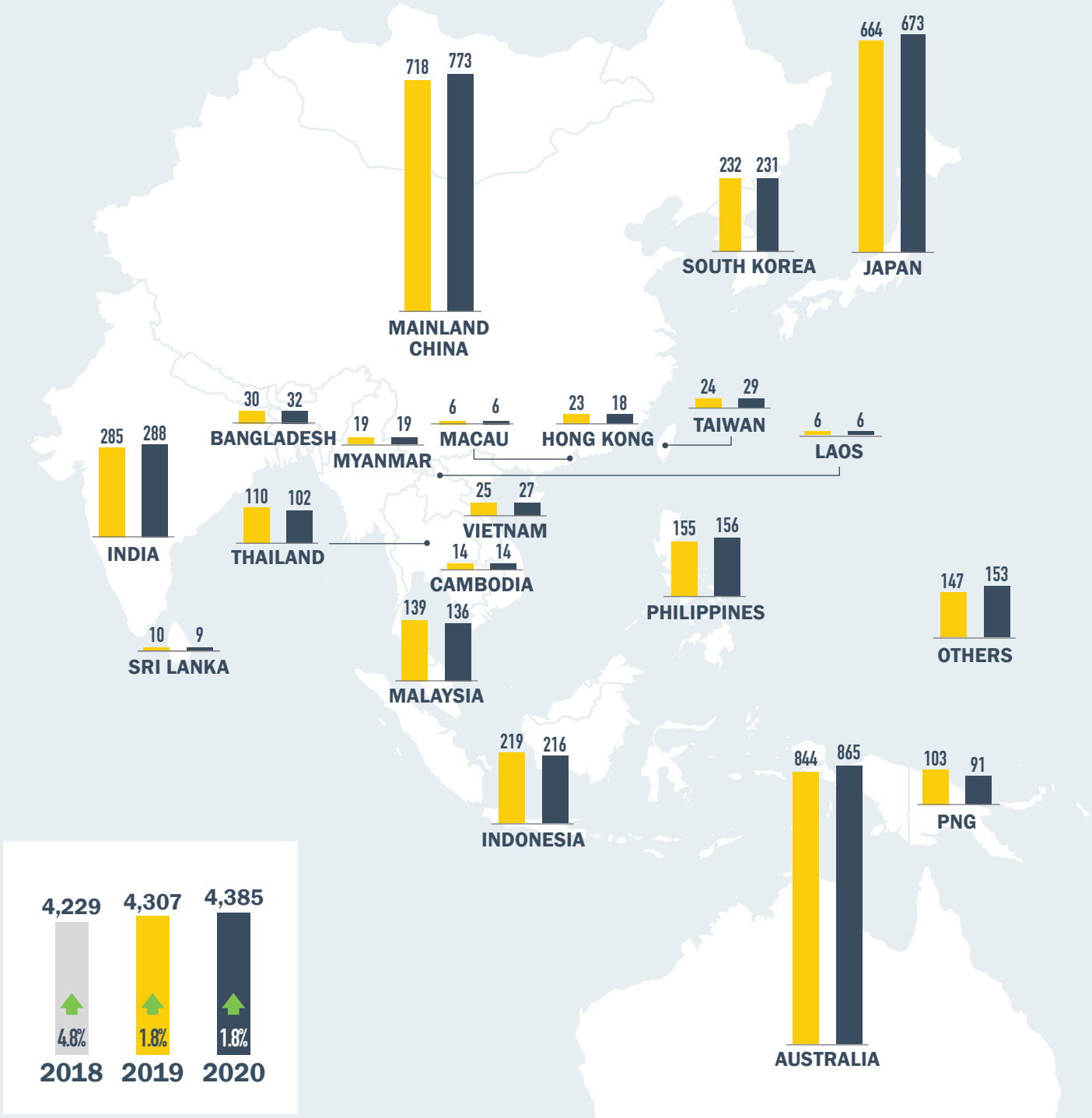


HELICOPTER FLEET MARKET SHARE



Note (1): The YE 2020 Asia-Pacific Civil Helicopter Fleet Report only includes data on turbine helicopters in service.
Note (2): "Replacement Cost" figures are based on the assumption that existing helicopters are replaced by the latest versions of their particular OEM variant at 2020 list prices.
Note (3): SAR refers to Search and Rescue.
Note (4): EMS refers to Emergency Medical Services.

REGIONAL OVERVIEW



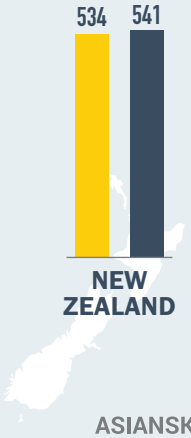
Note (1): Fleet distribution is based on turbine helicopters in service and their active bases of operation.
Note (2): Regions are defined in appendix.
Note (3): Others include Vanuatu, Nepal, Guam, New Caledonia, Fiji, Mongolia, Brunei, French Polynesia, Bhutan, Maldives, Solomon Islands, Singapore and Micronesia.

Australia remained the largest market– with a fleet of 865 operational civil turbine helicopters as of the end of 2020. Mainland China, Japan, New Zealand, and India followed, with 773, 673, 541 and 288 helicopters, respectively. Together, the top five countries, in terms of fleet size, accounted for more than 70% of the total 4,385 turbine helicopters in operation.

Mainland China and Australia recorded the most net additions in 2020, adding 55 and 21 helicopters to their respective fleets. Japan and New Zealand also saw notable increases in their helicopter fleets – by nine and seven units, respectively. Papua New Guinea on the other hand recorded the largest number of net deductions in 2020 – 12, the only region to experience a double-digit fleet reduction for two consecutive years.

Greater China recorded the greatest increase in turbine helicopters in 2020 with 55 – 7% growth since yearend 2019. Oceania, East Asia and South Asia also experienced an increase in their helicopter fleets – by 17 (1%) units, 11 units (1% growth) and seven units (2% growth), respectively.

Notably, despite mainland China having the most net additions in 2020, three Chinese operators had a combined total of 65 helicopters in storage (airworthy, registered, and operational so included in fleet numbers) at the end of 2020. These included a significant number of AW119s and Bell 407s, as well as lesser numbers of AW109s, H225s and H135s.



HELICOPTER FLEET (TURBINE ONLY)

LARGEST MARKET

865

AUSTRALIA

MOST NET ADDITIONS

+55

MAINLAND CHINA

MOST NET DEDUCTIONS

-12

PNG

FLEET GROWTH IN MAJOR MARKETS

	Net Fleet Growth		Growth Rate	
REGION	**2019**	**2020**	**2019**	**2020**
Greater China	+44	+55	6% ↑	7% ↑
Oceania	+1	+17	-	1% ↑
East Asia	+19	+11	2% ↑	1% ↑
South Asia	+9	+7	3% ↑	2% ↑
Southeast Asia	+5	-12	1% ↑	-2% ↓
TOTAL	**+78**	**+78**	**1.8%** ↑	**1.8%** ↑

	Net Fleet Growth		Growth Rate	
COUNTRY/REGION	**2019**	**2020**	**2019**	**2020**
Mainland China	+40	+55	6% ↑	8% ↑
Australia	-	+21	-	2% ↑
Japan	+15	+9	2% ↑	1% ↑
New Zealand	+20	+7	4% ↑	1% ↑
Taiwan	-	+5	-	21% ↑
India	-2	+3	-1% ↓	1% ↑
Vietnam	-	+2	-	8% ↑
Bangladesh	+9	+2	43% ↑	7% ↑
Philippines	+3	+1	2% ↑	1% ↑
Cambodia	-	-	-	-
Laos	-1	-	-14% ↓	-
Macau	-	-	-	-
Myanmar	+2	-	12% ↑	-
South Korea	+4	-1	2% ↑	-
Sri Lanka	+1	-1	11% ↑	-10% ↓
Malaysia	-9	-3	-6% ↓	-2% ↓
Indonesia	+4	-3	2% ↑	-1% ↓
Hong Kong	+4	-5	21% ↑	-22% ↓
Thailand	+7	-8	7% ↑	-7% ↓
Papua New Guinea	-14	-12	-12% ↓	-12% ↓
Others	-5	+6	-3% ↓	4% ↑
TOTAL	**+78**	**+78**	**1.8%** ↑	**1.8%** ↑

Rank by 2020 net fleet growth from the largest.

COUNTRY SNAPSHOTS

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AUSTRALIA

As the largest and most mature civil turbine helicopter market in Asia-Pacific, Australia's fleet stood at 865 helicopters at the end of 2020, 21 more helicopters than at the end of 2019. During 2020, 32 helicopters left the fleet, while 11 new and 42 pre-owned helicopters were added. In Australia, the SAR segment had the most net deductions in 2020 – seven fewer when compared to 2019.

GREATER CHINA

Greater China, including mainland China, Hong Kong, Macau and Taiwan, had 826 helicopters in 2020, 55 helicopters more than 2019, which was mainly attributed to the net addition of 55 helicopters in mainland China. In addition, Taiwan had a net increase of five helicopters between 2019 and 2020. Hong Kong saw five helicopters deducted from its fleet in 2020. There was no change to the helicopter fleet in Macau.

JAPAN

Japan ranked third in Asia-Pacific with 673 helicopters in 2020. Compared to 2019, there were nine more helicopters, giving it a growth rate of 1%. Japan ranked first in the EMS segment, with 82 helicopters at the end of 2020.

NEW ZEALAND

New Zealand had 541 helicopters in its fleet and had a net addition of seven helicopters between 2019 and 2020. Within the net additions, there were 22 pre-owned additions and two new deliveries, whilst 17 helicopters left the country completely.

INDIA

In India, there were 288 helicopters at the end of 2020 - three more helicopters than 2019, equivalent to a growth rate of 1%. India ranked third in Asia-Pacific in the offshore segment with 46 helicopters at the end of 2020.

SOUTH KOREA

South Korea's fleet increased by less than 1% between 2019 and 2020, which can be attributed to the growth in the SAR segment. Notably, Russian Helicopters had the biggest market share in South Korea.

INDONESIA

Indonesia's helicopter fleet saw a net fleet deduction in 2020 of three aircraft, with six fleet removals and three pre-owned helicopter additions. In the offshore segment, Indonesia experienced a continuous reduction in fleet size between 2018 and 2020, with one further helicopter leaving the fleet during 2020.

MALAYSIA

Malaysia had 136 helicopters in 2020 - was three less than at the end of 2019. Malaysia's fleet gained one new and three pre-owned helicopters in 2020, but also saw seven aircraft leave its fleet.

PAPUA NEW GUINEA (PNG)

PNG's helicopter fleet decreased by 12% which was the most across the Asia-Pacific region. One pre-owned helicopter did join the fleet, however there were a total of 13 aircraft leaving PNG in 2020.

PHILIPPINES

There was a net addition of one helicopter to the fleet in the Philippines in 2020. Whilst one new and two pre-owned helicopters joined the fleet, there were also two helicopters leaving the country.

THAILAND

Thailand had 102 helicopters at the end of 2020, with a net deduction of eight helicopters across the year being equivalent to a reduction of 7% over 2019. There were two new deliveries and two pre-owned helicopters additions, whilst 12 helicopters were removed from the fleet.

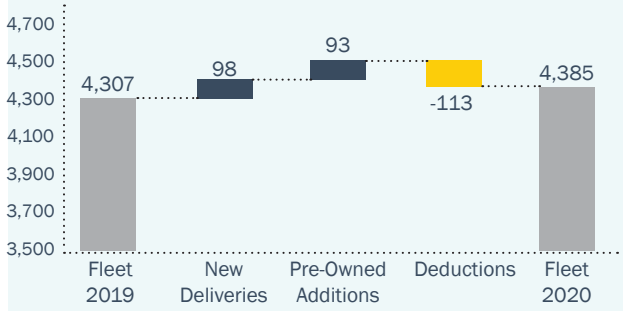
TOTAL FLEET BY COUNTRY/REGION

4,385 in Total

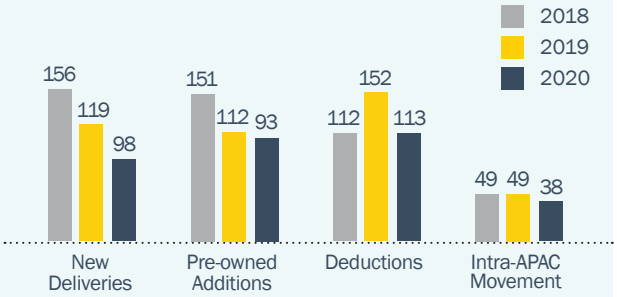
	AIRBUS	BELL	LEONARDO	MD	SIKORSKY	RUSSIAN HELICOPTERS	ROBINSON	AVICOPTER	ENSTROM	OTHERS	TOTAL	% OF TOTAL
AUSTRALIA	320	378	89	21	22		32		2	1	865	20%
MAINLAND CHINA	268	199	102	3	44	56	23	51	24	3	773	18%
JAPAN	352	136	119	15	30	1	17			3	673	15%
NEW ZEALAND	294	114	11	106	5	1	5		1	4	541	12%
INDIA	119	85	42	3	6	7	3			23	288	7%
SOUTH KOREA	52	37	27	5	44	62			2	2	231	5%
INDONESIA	85	69	14	4	14	10	3		17		216	5%
PHILIPPINES	88	35	14	12	2		4		1		156	4%
MALAYSIA	71	17	32	1	10		5				136	3%
THAILAND	29	51	8		11	2	1				102	2%
PAPUA NEW GUINEA	32	49			2	5				3	91	2%
BANGLADESH	4	11	4				13				32	1%
TAIWAN	10	2	3		14						29	1%
VIETNAM	11	2	3			11					27	1%
MYANMAR	8		6		5						19	<1%
HONG KONG	11			5			2				18	<1%
CAMBODIA	12	2									14	<1%
SRI LANKA	5					3	1				9	<1%
LAOS	5					1					6	<1%
MACAU			6								6	<1%
OTHERS	60	7	3	66	4	8	3			2	153	3%
TOTAL	1,836	1,194	483	241	213	167	112	51	47	41	4,385	100%

MARKET TRENDS

ADDITIONS AND DEDUCTIONS



HISTORICAL FLEET CHANGES

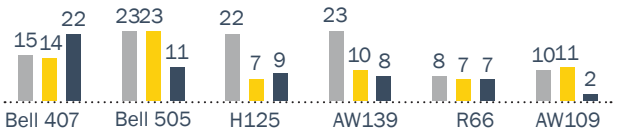


The Asia-Pacific's civil turbine helicopter fleet stood at 4,385 as of yearend 2020 - an increase of around 1.8% from the 4,307 helicopters at the end of 2019. The fleet witnessed total net growth of 78 units in 2020, attributed to 98 new deliveries, 93 pre-owned additions and 113 deductions. Deductions included out-of-region transactions, helicopter retirements, and units being placed in storage. Of the 113 deductions, 50 (44%) were more than 20 years old. A total of 38 helicopters changed operating bases within the region, with no impact to the total number of the regional fleet.

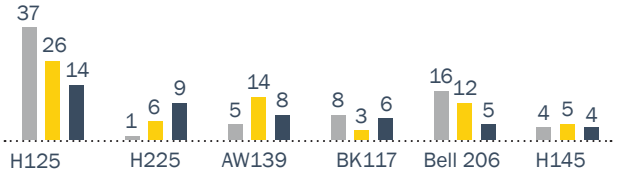
The number of new deliveries, which had reduced in 2019, saw a further reduction in 2020, with 21 fewer new helicopters being delivered in 2020 when compared to the preceding year. Mainland China saw the most new deliveries, with 54 helicopter deliveries in 2020, followed by Japan and Australia with 15 and 11, respectively.

2018 2019 2020

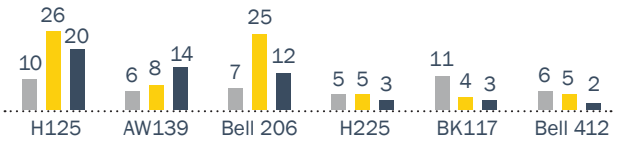
NEW DELIVERIES



PRE-OWNED ADDITIONS



DEDUCTIONS



Note: Rank by 2020 net fleet change from the largest

Bell Helicopter had the most new deliveries into the Asia-Pacific region in 2020 – 38 (39%) units. Airbus Helicopters and Leonardo came next with 25 (26%) and 11 (11%), respectively. In total, 63 (65%) newly delivered helicopters had a Utility configuration and were used for Multi-Mission operations. The Bell 505, which was the most popular newly delivered helicopter in 2019, experienced the steepest drop in the number of new deliveries in 2020 – a fall of 12 units. Therefore, the Bell 407 took over from the Bell 505 as the most popular new delivered helicopter model in 2020 – 22 units (22%). The Airbus H125 came next with nine (9%) new deliveries.

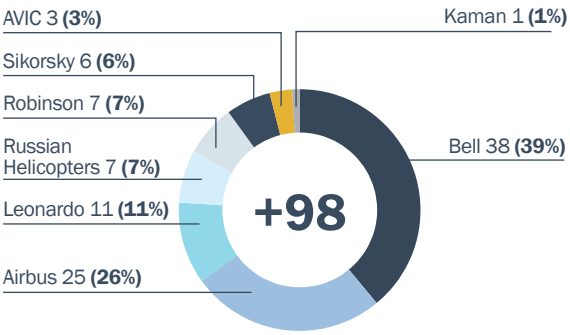
There were 93 pre-owned additions in 2020 – down from 112 in 2019. Of the pre-owned additions, 46 units (50%) were Airbus Helicopters, 24 units (26%) were Bell, and 12 units (13%) were Leonardo. The Airbus H125 was the most popular pre-owned addition with 14 units (15%), followed by the Airbus H225 with nine units (10%).

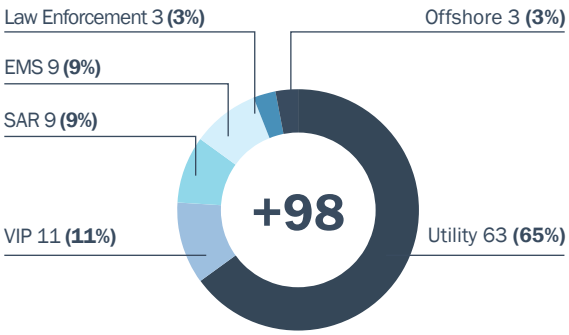
There were 113 fleet deductions in 2020. Of these, 53 units (47%) were Airbus Helicopters, 23 units (20%) were Bell, and 17 units (15%) were Leonardo. The Airbus H125 saw the largest deduction from the Asia-Pacific fleet – with 20 units (18%), followed by the Leonardo AW139 with 14 units (12%).

The regional fleet has been growing y-o-y since 2014 and the growth is expected to continue in 2021, albeit at a slower pace.

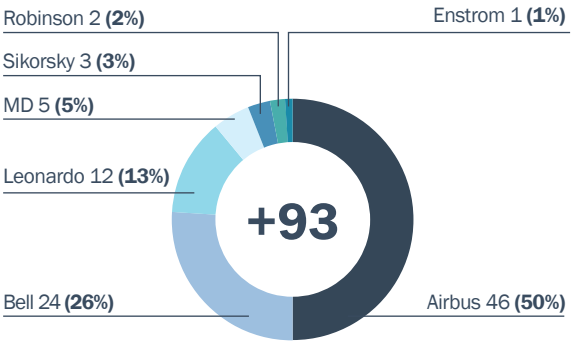
FLEET CHANGES BY OEM AND CONFIGURATION

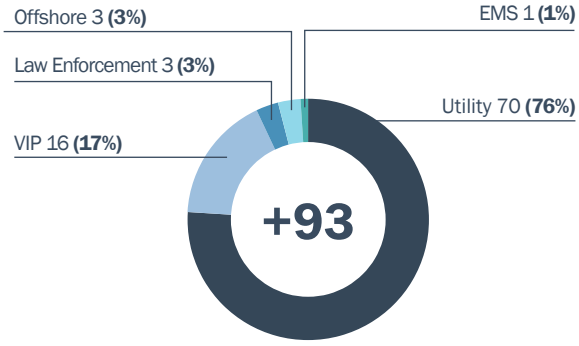
New Deliveries



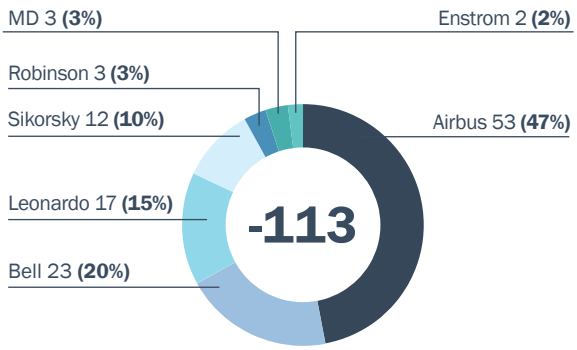


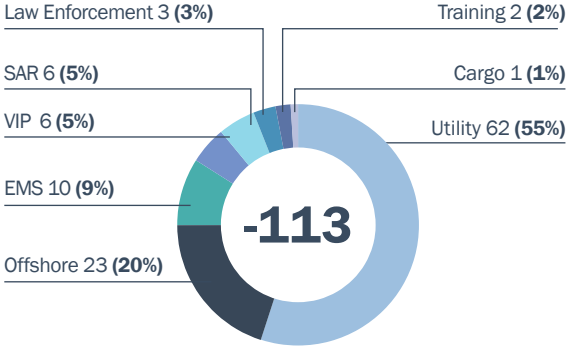
Pre-owned Additions





Deductions





OPERATOR OVERVIEW

At the end of 2020, the top commercial helicopter operators with more than 20 turbine helicopters in the Asia-Pacific region operated a total of 740 helicopters, accounting for 17% of the total fleet.

CITIC Offshore Helicopter Co (COHC) had the largest fleet, operating a total of 78 helicopters, closely followed by Aero Asahi (70), and Nakanihon Air (65). Of the top 21 operators in the region, eight were based and primarily operate in China, four in Australia and three in Japan.

Nine operators saw their fleets grow in 2020, while seven operators saw their fleet contract. The fleets of five operators did not change

COHC was notable among the top 20 operators, as well as among the top seven offshore operators. By adding four units to its fleet, COHC managed to remain the largest helicopter operator in Asia-Pacific.

Two Japanese operators had the second and the third biggest fleets among the top 20 operators. Aero Asahi and Nakanihon Air both maintained their ranking with a slight change in their fleet numbers; Aero Asahi decreased by three units and Nakanihon Air increased by just one helicopter.

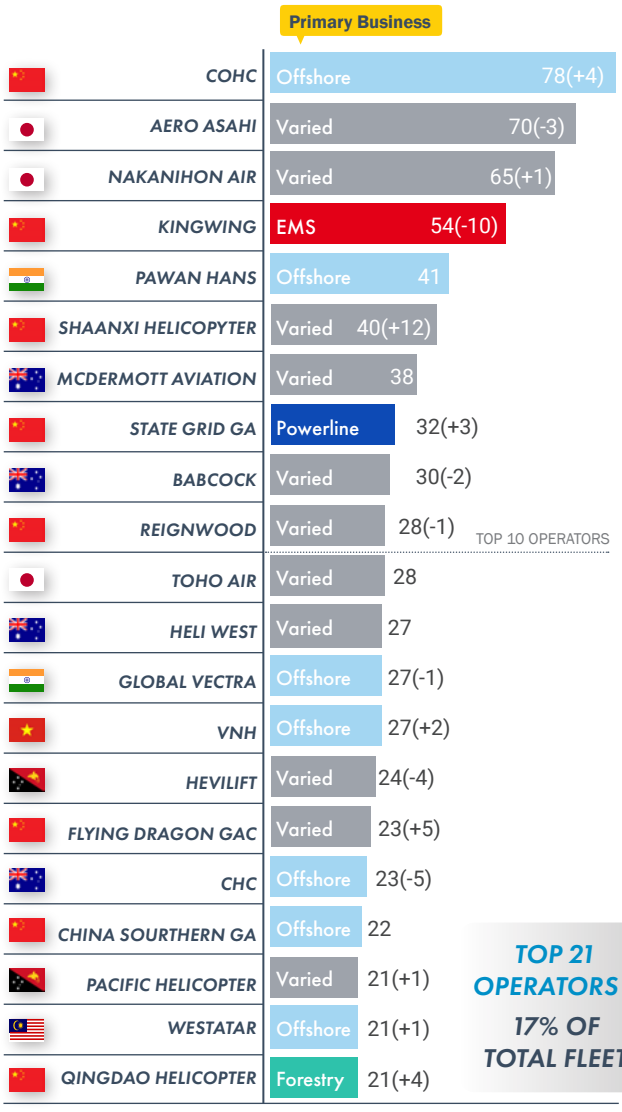
Shaanxi Helicopter - Bell's distributor in mainland China, had a fleet of 40 helicopters at the end of 2020.

Kingwing experienced the largest contraction (10 helicopters), followed by CHC (five), and Hevilift (four).

Overall, several Australian operators were scattered around the top 20 operators list. McDermott Aviation had no change

TOP COMMERCIAL OPERATORS

With more than 20 turbine helicopters



TOP 21 OPERATORS = 17% OF TOTAL FLEET

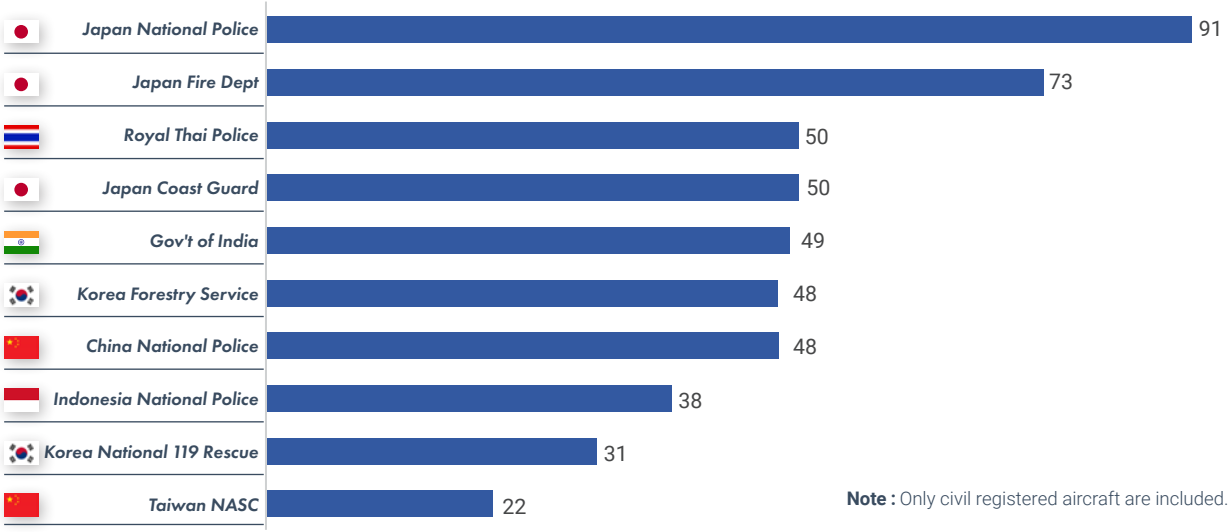
in its fleet size but dropped one place in ranking, whilst Babcock had a small decrease in its fleet and a two place drop in its ranking. Heli West jumped up three places despite no change in its fleet, whilst CHC dropped six ranks with five units leaving its fleet.

There were also two Indian operators on the list. Pawan Hans had no change in its fleet number and retained its ranking, whilst Global Vectra dropped two places when one aircraft left its fleet.

Weststar was the only Malaysian operator on the list. It retained its rank and increased its fleet by one aircraft in 2020.

TOP GOVERNMENT OPERATORS

With more than 20 turbine helicopters



Note : Only civil registered aircraft are included.

Government helicopter operators also play a vital role in the Asia-Pacific helicopter market. At the end of 2020, there were a total of 615 turbine helicopters in the fleets of Asia-Pacific government operators - 14% of the total helicopter fleet in the region.

Overall, the Japan National Police had the largest fleet in the region with 91 helicopters, followed by the Japan Fire Department (73), and the Royal Thai Police (66).

Japan, home of the largest government fleet in the region, operated 223 turbine helicopters through its different government divisions: Japan National Police (91) , Japan Fire Dept (73), Japan Coast Guard (50), and the remaining nine helicopters operated in smaller numbers by various different government agencies.

South Korea came second with multiple government operators: Korea Forestry Service (48 helicopters), Korea National 119 Rescue (31), Korea National Police (17) and Korea Coast Guard (17).

Mainland China together with Hong Kong and Taiwan operated 99 government helicopters, split among the China National Police (48), Taiwan NASC (22), the Ministry of Transportation (20) and the HK Government Flying Service (9).

SPECIAL FEATURE:

COVID-19 IMPACT ON THE ROTARY INDUSTRY IN APAC

The outbreak of the COVID-19 pandemic dramatically affected global economic activities, especially general aviation, which suffered losses due to a decline in activity. The COVID-19 impact, combined with a crash in oil prices, caused a slowdown in the general aviation industry from the second quarter of 2020.

In the Asia-Pacific region, the outbreak of COVID-19 had a huge effect on the helicopter market during the first half of 2020. Despite the shock, demand began to return in the second half of 2020, which led to the helicopter market rebounding.

To better understand the development of the helicopter market in Asia-Pacific, Asian Sky Media invited five helicopter operators, one OEM, and two lessors, to share their experiences during the first year of the COVID-19 pandemic and their expectations for the helicopter market in the next few years.

OPERATOR PERSPECTIVE

During the outbreak of COVID-19, many operators encountered difficulties in operation due to government regulations and travel restrictions. Nonetheless, operators forecast slow but positive growth in the helicopter market.

A total of five helicopter operators answered our survey. One is **Qingdao helicopter -** one of the earliest established helicopter operators to offer general aviation services in mainland China. Another is **Chongqing General Aviation**, a subsidiary of Chongqing General Aviation Industry Group, with business covering helicopter manufacturing, sales and maintenance, general aviation operation, and training. **PHI** is one of the world's leading helicopter services companies with its main business in offshore and air medical services, whilst **Asian Aerospace** offers a variety of different services including charter, maintenance and FBO services. Last but not least is **INAEC**, which was the first Filipino-owned private airline with its main business focusing on offshore, charter and FBO services.

How did COVID-19 affect your operations and fleet in 2020?

Yu-Zhu Chen, Deputy General Manager of **Qingdao Helicopter**, mentioned four main areas that were impacted by COVID-19. First of all, the signing of contracts was affected by COVID-19 between February and March 2020 due to the delay of bid submissions, which indirectly reduced Qingdao Helicopter's revenue. Nonetheless, the demand from its clients was quite stable. Second, the cost of cabin crew's work shifts increased due to higher commuting and quarantine expenses, as well as the cost of purchasing disinfection goods. In addition, technical support from foreign experts either ceased or was postponed. Nonetheless, four more helicopters were added to its fleet as the need for multi-mission large-sized helicopters increased dramatically during the peak of the pandemic.

Min Liao, Marketing Manager of **Chongqing General Aviation**, said that whilst flight operations were lower, there were no changes to its fleet of helicopters.

Pierre Lavoie, Logistics Director of **PHI**, said that there were no real changes and most business remained the same as usual.

Piero Rodriguez, Director of Special Accounts at **Asian Aerospace**, said that the first weeks of the pandemic and national lockdowns in the Philippines were difficult because Asian Aerospace's cabin crew and operation teams could not to the airport easily without certifications and travel documents. For the supply of helicopter services, operators still encountered difficulties as various health tests and government documents were required to travel and for helicopters to take off from the airport. On the other hand, demand started to increase as people got used to the new policies and regulations. "Among various services Asian Aerospace offered to clients, tourism flights were the most affected as most tourist destinations did not allow visitors during the peak of COVID-19 pandemic. In addition, corporate flights were slightly impacted due to the cost-cutting decisions made by our clients." Said Piero.

Dexter Ampong, General Manager of **INAEC**, told ASM that helicopter on-demand charter decreased and INAEC's aircraft management clients asked for discounts during the peak of COVID-19 pandemic.

How did you manage the impact of COVID-19?

Yu-Zhu Chen, Deputy General Manager of **Qingdao Helicopter**, told ASM that it decreased the number of work shifts amongst its staff. The company also brought in a new rule which required its employees to commute by air or charter car to try and minimize the opportunities for infection. Whilst this did mean that the company was able to maintain its daily operations, it also increased the company's costs. Qingdao Helicopter also increased its purchase of disinfection goods to fight the COVID-19 impact.

Min Liao, Marketing Manager of **Chongqing General Aviation**, said that the company would follow its past steps to confront challenges and is dedicated to developing markets during the peak of COVID-19.

Pierre Lavoie, Logistics Director of **PHI**, stated that the biggest impact was COVID-19 testing for all of its passengers. "In addition, aircraft modification to put filtration in the air circulating systems and cleaning procedures of the aircraft post flights with approved products are the main measures for PHI to lower the infection risk." said Pierre.

Piero Rodriguez, Director of Special Accounts of **Asian Aerospace**, revealed that Asian Aerospace set up new regulations to minimize the impact of COVID-19 on the business. "First of all, to make sure that our facilities were sanitary, and employees were safe and sound before the widespread of the COVID-19 pandemic, Asian Aerospace purchased disinfection equipment and goods to put in all of the aircraft, lounges, and offices. Also, our cabin crew, ground engineers, office staff, and sales employees take COVID-19 tests on a regular basis to ensure flight safety.

Besides, physical contact between our cabin crew and passengers is strictly prohibited to lower the infection risk. Eventually, Asian Aerospace offered accommodation close to the airport for the cabin crew and ground employees to avoid further contact with potential risks through public transportation, or crowded confined spaces."

Dexter Ampong, General Manager of **INAEC**, stated that the whole company instituted protocols to prevent the spread of COVID-19 in working areas, whilst the company was still able to meet its operational and business demands.

What are your expectations for the helicopter market in the coming years?

Yu-Zhu Chen, Deputy General Manager of **Qingdao Helicopter**, gave ASM some of her own perspectives. Firstly, she said that the central government did not increase its budget for general aviation. Instead, the central government shrank its budget due to the COVID-19 pandemic. It is expected that the aviation industry will recover to pre-COVID-19 levels in 2023 and then grow rapidly. Additionally, the economically prosperous and advanced provinces saw a new type of demand for helicopters, which was passenger flights. Eventually, the overall forecast is stable as client's needs of Qingdao Helicopter have evolved from general to specific needs.

Min Liao, Marketing Manager of **Chongqing General Aviation**, said "We believe that growth in the helicopter market will remain positive, but steady."

Pierre Lavoie, Logistics Director of **PHI**, mentioned that the positive rebound from different issues such as oil and gas prices, as well as the COVID-19 pandemic would bring an upward trend for the helicopter market in Asia-Pacific.

Piero Rodriguez, Director of Special Accounts at **Asian Aerospace**, said that the helicopter market in Asia-Pacific should improve once documentation requirements and travel restrictions are lifted. He said that the time-efficiency of helicopters can dramatically shorten the travel time between two places, which is an incentive to potential clients. "The helicopter market in the Philippines has grown steadily. Once the economic situation and company operations recover to the pre-COVID-19 standard, people will definitely fly again." Said Piero.

Dexter Ampong, General Manager of **INAEC**, said that "If the economy is not going to recover fast enough, helicopter demand will not reach pre-covid levels."

OEM PERSPECTIVE

Bell Helicopter, an aviation pioneer with strategic locations around the globe, also answered ASM's survey questions.

How did COVID-19 influence your orders and deliveries of helicopters in 2020?

Caroline Wagner, Sales Strategy Manager of **Bell**, said that the uncertainty and fear around COVID-19 had a dramatic effect on orders in 2020 as Bell's customers held back to manage the fallout from the pandemic. In terms of deliveries, she said that Bell Asia continued its daily operations throughout 2020 and managed to deliver new

aircraft as well as provide its industry leading aftermarket service and support to its customers.

How did you manage the impact of COVID-19?

Caroline Wagner, Sales Strategy Manager of **Bell**, said: "Bell's first priority is to ensure the safety of staff by adhering to and implementing the Singapore government's safe distance regulations and other workplace safety measures to fight COVID-19. We created a pandemic team especially to ensure these measures were implemented and communicated clearly to all Bell's employees. By doing so, we can focus on supporting our Asia-Pacific customers, who are mostly para-public operators, serving and saving people with their helicopters. In other words, Bell is proud to say that all of our employees were able to support our customers throughout the worst time of the lockdowns in the region."

What is your expectation for the helicopter market in the coming years?

Caroline Wagner, Sales Strategy Manager of **Bell**, said that Bell continues to see positive long-term growth and demand for the helicopter market in Asia-Pacific. She said: "There are four segments Bell is particularly interested in and they all can be categorized as para-public, which means for the greater good of the public. These are EMS, Law Enforcement, Disaster Management, and SAR. As economies in Asia continue to grow and expand, people here will continue to expect their governments or private institutions to provide these essential services. These lifesaving services have gained a new level of priority given the increasing frequency of natural disasters such as typhoons and floods in the past few years. In particular, the Bell 429 is in active use with Law Enforcement in the region, such as the Indonesian Police, Philippines Police, and Royal Thai Police."

LESSOR PERSPECTIVE

A delay in paying leasing fees due to operators flying fewer missions led to difficulties both for lessors and operators. Nevertheless, the helicopter market showed great resilience in the second half of 2020, which is a good sign for the coming years.

In total, two lessors in Asia-Pacific responded our survey. The first was **LCI**, a privately owned aircraft lessor founded in 2004. The other is **CMIG**, a leading global investment group headquartered in mainland China.

How did COVID-19 affect your leasing contracts in 2020?

Nigel Leishman, Executive Vice President & Global Head of Marketing at **LCI**, said: "At the beginning of 2020 there was optimism in the market, but that quickly changed in April. Initially we prepared for the worst as we saw helicopter utilization fall. However, the market proved resilient and by the end of 2020 flight hours in most of our markets had returned to normal." He mentioned that for offshore operators, helicopter operations were initially disrupted by restrictions placed on travel and border closures which had an impact on the oil and gas market. Nonetheless, its offshore operators put in place procedures and standards that allowed them to continue to provide safe and reliable services for their customers. In the meantime, demand for EMS services actually increased, and LCI has seen utilization in some markets reach historical highs as people travel locally or enjoy their holidays closer to home. Overall, the market has not been affected as severely as other sectors because helicopters continue to provide mission critical services.

Fang Xu, General Manager Assistant of Transport Leasing Department at **CMIG**, said that COVID-19's impact on the economy and society around the world was out of CMIG's expectation. He said that during the outbreak of COVID-19 in the beginning of 2020, nearly all of the general aviation corporations in agriculture, manufacturing, and the consumer services industry ceased their operations. "The unusual operation of operators caused leasing fee payment delays to CMIG and other lessors, which indirectly influenced operations of both lessors and lessees." Said Fang.

How did you manage the impact of COVID-19?

Nigel Leishman, Executive Vice President & Global Head of Marketing at **LCI**, said that LCI's business continuity plans quickly kicked into action and business managed to continue without too many issues. He said "Obviously, many of us had the disruption of working from home, which was tough for a close-kit team such as LCI. But we all spent more time on video conferences and overall, our internal and external communication has actually increased. As our team is global based, we are closer to our customers and other stakeholders to meet them in person where local regulations allowed." He also mentioned that LCI continued to take new deliveries and transitions of the current fleet between lessees as LCI adapted to new processes including remote inspections, and closer cooperation with its partners to ensure deliveries can go ahead. This is the most important factor for LCI to smoothly go through the dark times in 2020.

Fang Xu, General Manager Assistant of Transport Leasing Department at **CMIG**, talked about methods to fight against COVID-19 both internally and externally. "Internally, we followed regulations set up by the government to arrange home office and work shifts for our employees to lower the infection risks due to the gathering of our employees. Besides, by constructing highly efficient online reviews and approval mechanisms over the Internet, we were able to continue regular operations within the company during 2020." CMIG rapidly reacted to the possible dilemma that helicopter lessees might encounter due to the COVID-19 pandemic according to Fang. "On the one hand, we proactively communicated with our lessees to understand the potential difficulty paying leasing fees attributed to the COVID-19 pandemic. On the other hand, we negotiated with our financing banks to strive for delay payment by lessees. "

What are your expectations for the helicopter market in the coming years?

Nigel Leishman, Executive Vice President & Global Head of Marketing at **LCI**, said that 2020 demonstrated the importance of helicopters and LCI expects demand to increase, especially in larger twin-engine markets, where leasing is to take a larger share. Coming out of COVID-19, budgets will be tight, hence, an operating lease provides an efficient and attractive option for operator's financing. Nigel said "We are seeing increased demand across all missions, including EMS where fleet renewal continues, and new markets are opening up. The oil and gas market is recovering and contracts which may have been delayed from last year are now being awarded. However, with the move towards renewables, we see increasing opportunities in markets such as offshore wind where we expect significant growth in established markets such as Europe and emerging markets in Asia and North America. These opportunities mean that there are more investors interested in the helicopter market. One of the most significant of these was with SMFL in Japan." Nigel emphasized that given its proven track record, LCI is optimistic about opportunities in the helicopter market and are very much open for business.

Fang Xu, General Manager Assistant of Transport Leasing Department at **CMIG**, stated that the global economic center continues to shift eastwards and mainland China is playing a more and more important role in the global economic environment. "As the successful model to fight against the COVID-19 pandemic, the social economic order in mainland China has gradually recovered to pre-COVID-19 levels and China has started to lead global economic activities." Said Fang. He believes that the overall economic recovery will boost the general aviation market, saying that "As the methods and experiences to control and prevent the COVID-19 pandemic become more and more mature, the helicopter market, especially leasing, will get out of the dark cloud and welcome a new round of development opportunities in the post-COVID-19 period."

CONCLUSION

Asia-Pacific is expected to remain as the fastest growing global region for helicopters for at least the next five years. The region is considered to be a lucrative market mainly for domestic and regional helicopter aftermarket players. Although the COVID-19 pandemic seriously hit the helicopter market, the forecast still shows a positive sign, as most of the interviewees believe that the region will return to growth once the pandemic has subsided.

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LCI'S ASIAN ADVANTAGE

CHRIS LLOYD
VICE PRESIDENT MARKETING

Chris Lloyd joined LCI in 2018 as Vice President Marketing for Asia, based at its office in Singapore. He has over 30 years' experience in aviation, most of it in Asia, with a proven track record in aircraft sales and leasing. He previously led a helicopter and fixed-wing sales and brokerage company based in Singapore, offering consultancy, leasing and valuation services across the Asian and Oceania regions. Chris is a fixed wing and helicopter pilot.

How would you describe the past year for LCI?

Throughout the past 12 months, despite the challenges of Covid-19, LCI's doors have remained firmly open for business. We have continued to move leased helicopters between customers and take delivery of new helicopters. The travel and aviation sectors have been materially affected by the pandemic, but the helicopter leasing marketplace has remained active, and we have played a leading role in that with much of our activity taking place in Asia-Pacific.

What impact has Covid-19 had on the helicopter market?

While some parts of the helicopter market have been slightly impacted by Covid-19, the mission critical operators and the lessors they partner with, such as LCI, were able to respond tactically to the situation.

The helicopter leasing sector has displayed remarkable resilience, particularly in regions such as Asia, where we have seen a widespread recovery in aircraft utilisation in recent months. Offshore activity has returned to near-normal levels, and EMS activity has actually increased in countries such as Australia as many people are now holidaying at home. Such are the returning levels of confidence that we're already seeing new contracts being awarded which is increasing demand for leased helicopters.

In the last three months we have delivered two AW139 helicopters to customers in the region, while extending other lease agreements. Most recently we delivered a AW139 helicopter to SFS Aviation, a longstanding Asian customer, to support its offshore activities in Thailand. Also, in 2020 we added two more helicopters to our fleet in Australia, which is now our single largest market with 18 helicopters.

Has Covid-19 affected investor confidence in the helicopter market?

The resilience in the helicopter leasing marketplace has meant that capital continues to be invested. LCI led the industry in

sealing several new partnerships with financial institutions in 2020, highlighting the financial community's confidence in the helicopter sector and their long-term belief in helicopters as investment grade assets.

Chief amongst these was our establishment of a joint venture helicopter leasing business with Japan's Sumitomo Mitsui Finance and Leasing Company, Limited (SMFL) in September 2020. The vehicle launched with the initial acquisition of 19 next generation helicopters worth US$230 million, with SMFL and LCI co-investors in the partnership. Despite only being launched a few months ago, there are already plans to grow this fleet significantly.

The young, modern helicopters acquired by our joint venture are deployed with operators across the globe on missions including EMS, SAR and offshore wind, with a strong lessee profile, long average lease tenor and full power by the hour maintenance coverage.

Earlier in 2020, we also established a co-investment vehicle with Thora Capital, LLC and RIVE Private Investment as partners. The vehicle currently holds six Leonardo AW139s and three Airbus H130 helicopters valued at over US$100 million, all of which have long-term capital in place and are currently deployed in Australia and the USA.

What challenges has LCI faced in the last 12 months?

The Covid pandemic created a set of operational and technical challenges for operators and lessors alike. For LCI, these arose with the need to perform remote inspections and transitions due to restrictions on travel. However, the investment we have made over the last five years in creating a robust helicopter leasing, management and investment platform has allowed us to overcome these challenges.

Within our platform, we have all the skill sets and expertise – operational, technical, legal, financial, tax and more – to manage helicopter investments, placements, transitions and reconfigurations across sectors and geographies.

For example, that enabled us to efficiently reconfigure, remarket and transition three helicopters based in China to new operators in the Asia-Pacific region.

What are your future expectations for the Asia helicopter market?

Asia has always been a region of major strategic importance for LCI, accounting for around a third of our leased fleet placements. We have had an office in Singapore since 2008, and together with our parent the Libra Group we have a long-standing history and record in the region.

That focus continues to grow in 2021 with many opportunities on the horizon. These include in the EMS sector, which is at different stages of maturity across the region, ranging from large established markets like Japan, Australia and New Zealand where replacement aircraft will be needed, to new markets such as South Korea, Taiwan and China.

The need for helicopters to support the exciting offshore wind market is starting to grow in Asia. We see this happening first in Taiwan, but with longer term potential in China, South Korea and later Japan.

The offshore oil and gas market, in which LCI is already active in Asia, continues to display significant potential for new helicopter placements, especially in markets such as Malaysia, Thailand and India.

These are just a few of the opportunities that we see developing in Asia in the coming years. LCI continues to invest in its presence and partnerships and is very much open for business in this exciting and dynamic region.

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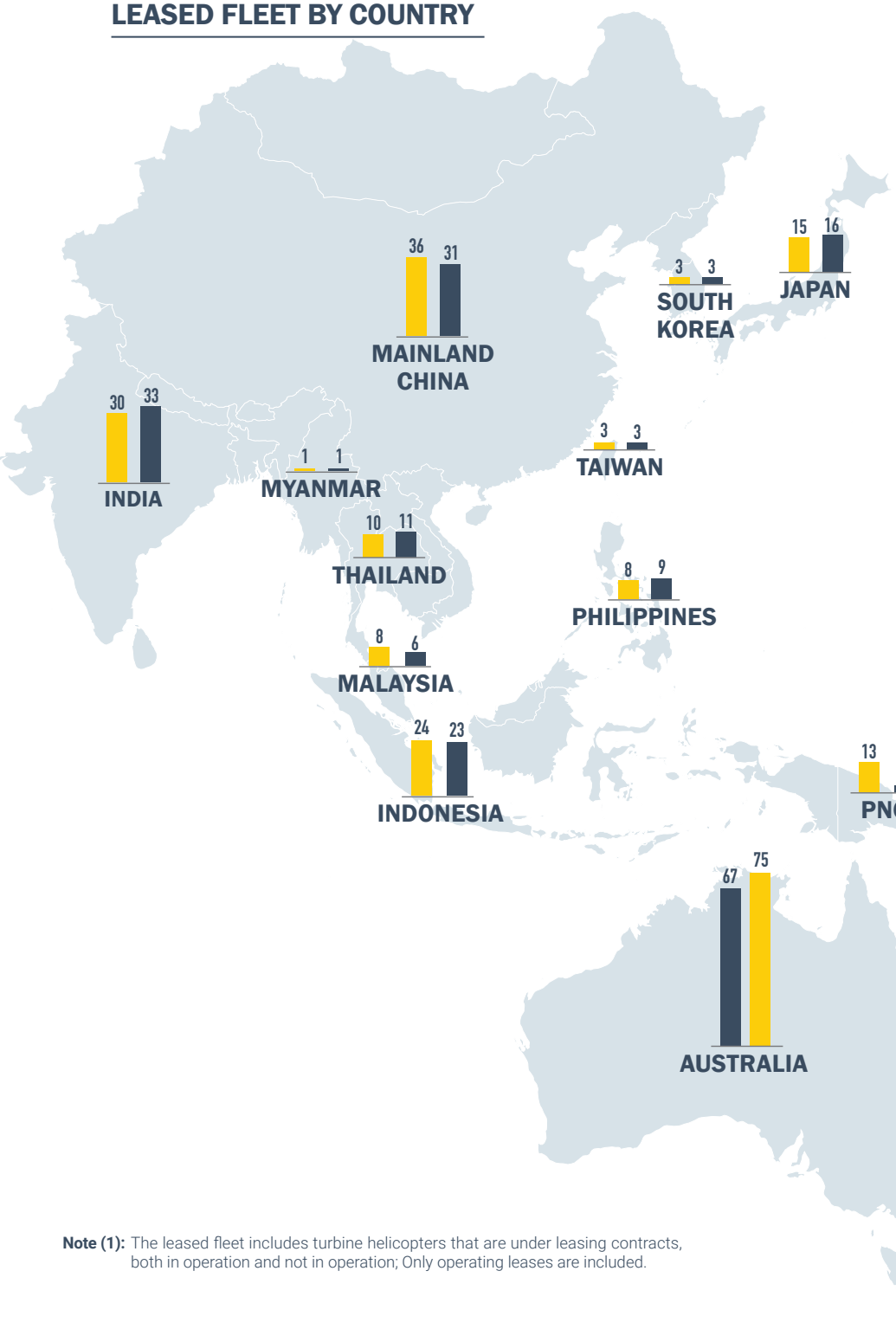
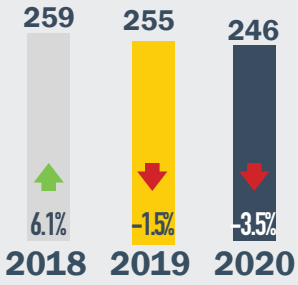
MARKET UPDATE:
LEASING MARKET

LEASED FLEET BY COUNTRY





LARGEST MARKET
75
AUSTRALIA

MOST FLEET NET ADDITIONS
+8
AUSTRALIA

MOST FLEET NET DEDUCTIONS
-10
PNG

Note (1): The leased fleet includes turbine helicopters that are under leasing contracts, both in operation and not in operation; Only operating leases are included.

MAJOR LESSOR MARKET SHARE

Lessor	Fleet Size (Units)	Replacement Cost ($M)
MILESTONE	71	1,154
AIRWORK	36	272
LCI	24	351
MACQUARIE	14	172
TEXTRON	14	112
CMIG	8	25
TOTAL	**185**	**$2,164**

Note (2): 'Replacement Cost' figures are based on the assumption that all existing helicopters would be replaced by the latest versions of their particular OEM variant and at 2020 list prices.

The Asia-Pacific civil turbine helicopter leasing fleet stood at 246 helicopters at yearend 2020 – a decrease of nine units since 2019. The market, which had been growing until 2018, has now experienced two consecutive years of decline – falling by 1.5% in 2019 and a further 3.5% in 2020. Papua New Guinea saw the steepest decline in leased units, losing ten helicopters, while Australia experienced the biggest increase with the addition of five more helicopters.

Milestone Aviation retained the top spot as the largest lessor in the Asia-Pacific region with 71 helicopters in its fleet. Airwork and LCI came second and third with 36 and 24 helicopters in operation as of yearend 2020, respectively.

In terms of fleet value, the 'Big Four' lessors — Milestone, LCI, Airwork and Macquarie – those with over $177 million of leased assets, accounted for more than 70% of the total fleet value; boasting assets of US$1.2B, $351M, US$272M, and US$172M, respectively.

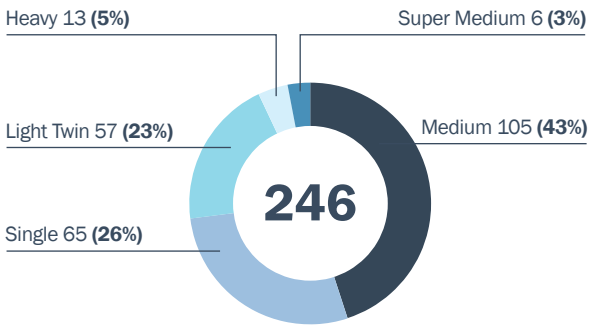
Airbus was the market leader with a fleet of 91 (37% market share) leased helicopters as of yearend 2020. Leonardo and Bell came next with leased fleets of 69 (28% market share) and 55 (23% market share) helicopters, respectively. The Leonardo AW139 was the most popular leased helicopter model with 54 units (22%). The Airbus H125 with 25 units (10%) was the second most popular leased helicopter model, followed by the Bell 412 with 21 leased units (9%).

Around 40% (97 units) of the helicopters leased have a utility configuration and are used for multi-mission operations, followed by offshore O&G and EMS configured helicopters - with 27% (69 units) and 20% (48 units) of the total leased fleet. 2020 saw the most net reductions in the EMS configured leased fleets – by four units.

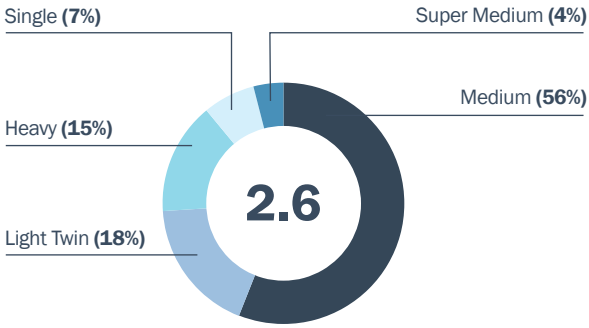
The majority of leased helicopters belonged to the medium-sized category - 105 units (around 43% of the total leased fleet), followed by single-engine and heavy-size models, with 65 (around 26%) and 57 (around 23%), respectively.

LEASED FLEET BY SIZE CATEGORY

Fleet Size (Units)

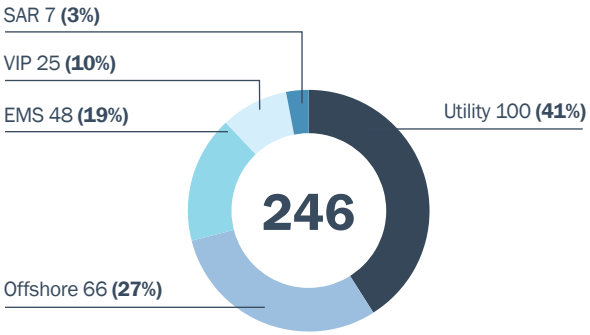


Replacement Cost ($B)

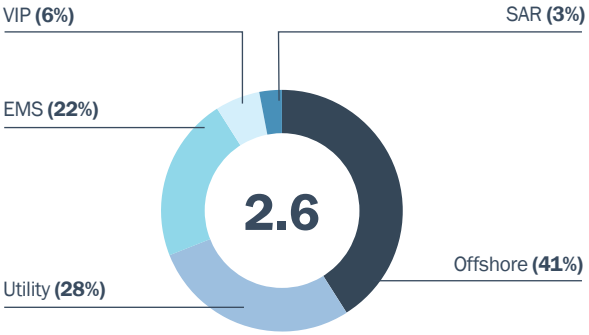


LEASED FLEET BY CONFIGURATION

Fleet Size (Units)

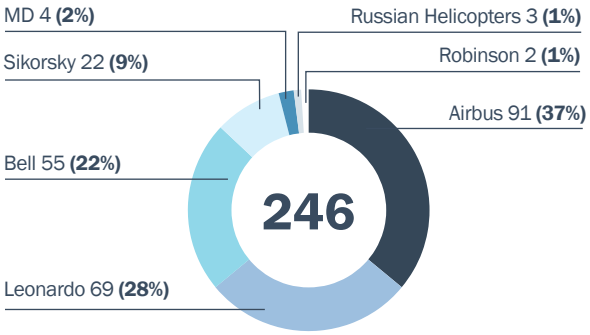


Replacement Cost ($B)

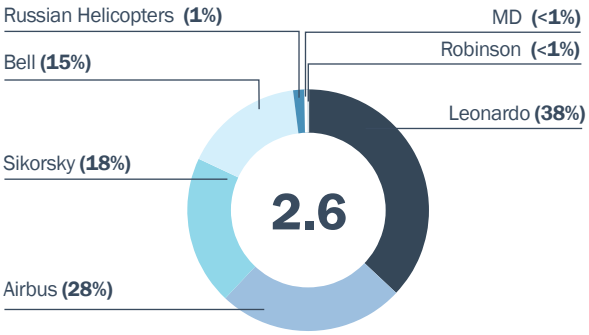


LEASED FLEET BY OEM

Fleet Size (Units)



Replacement Cost ($B)



MAJOR LESSOR (MODEL)

		MILESTONE	AIRWORK	LCI	MACQUARIE	TEXTRON	CMIG	TOTAL
AIRBUS	AS355		4					4
	AS365	4						4
	BK117		20					20
	H125		8				8	16
	H130	2	2					4
	H135	1		2	1			4
	H145	2	2		3			7
	H175	2						2
	H225	3						3
BELL	Bell 407					4		4
	Bell 412	9				5		14
	Bell 429					5		5
LEONARDO	AW109	1						1
	AW139	21		19	6			46
	AW169	3		1	3			7
	AW189	2		2				4
SIKORSKY	S-76C++	8			1			9
	S-76D	5						5
	S-92	8						8
	Total	**71**	**36**	**24**	**14**	**14**	**8**	**167**

MAJOR LESSOR (BASE OF OPERATION)

	MILESTONE	AIRWORK	LCI	MACQUARIE	TEXTRON	CMIG	TOTAL
AUSTRALIA	26	7	18	7			58
NEW ZEALAND		26		1			27
INDIA	17		1		3		21
MAINLAND CHINA	9					8	17
INDONESIA	8				5		13
THAILAND	9		1	1			11
PHILIPPINES				1	6		7
MALAYSIA	1		2	1			4
TAIWAN				3			3
PNG		3					3
SOUTH KOREA	1		1				2
MYANMAR			1				1
GRAND TOTAL	**71**	**36**	**24**	**14**	**14**	**8**	**167**

OCEANIA AVIATION'S HELICOPTER HANGAR: LEADING THE WAY IN SPECIALISED ROTARY SUPPORT

Oceania Aviation occupies substantial premises across Auckland's Ardmore Airport in New Zealand, covering a broad range of helicopter and fixed wing services across multiple hangars and specialist workshops. Its largest hangar, often referred to as the "Helicopter hangar", is a state-of-the-art facility providing heavy maintenance and related services for most turbine-powered rotorcraft types.

With a 1,000 square metre footprint and housing three specialist helicopter divisions, Oceania's Auckland Helicopter hangar is New Zealand's leading specialist rotary maintenance facility. Performing much more than just line and base maintenance, the three specialized teams that work in the hangar work on a huge range of projects from both local and international operators across maintenance, upgrades, customizations and component overhauls. The hangar also houses their Part 148 Manufacturing division, which designs and manufactures specialist role equipment for operators needing to expand or upgrade their mission profiles.

Over the last 12 months, Oceania's Helicopter hangar – despite global disruption across economy, transport and travel – has maintained a healthy level of demand for its teams' services, which can be credited to the scope of work that can be carried out within the facility. While the demand for customization and upgrade projects saw some reductions during the initial 'hit' of COVID-19, Oceania Aviation was deemed to be an "Essential Services provider" within the local New Zealand market. This meant that urgent maintenance and repair work for aircraft operators carrying out essential work (such as EMS, firefighting and agricultural services) continued to keep the hangar busy.

With New Zealand now also being considered a "safe haven" compared to many countries around the globe who are still battling the pandemic and experiencing ongoing lockdowns, the demand for international work is also stepping up. Helicopter operators are recognising the reduced risk and chance of delays by sending their helicopter work down to New Zealand from abroad, where the staff have been back to "business as usual" and at full capacity since April last year. In fact, the Helicopter Projects team, which provide maintenance, upgrades and customisations, estimate a 60/40 split of international to local helicopter work that comes through its division. A high level of international demand is also seen by the Manufacturing and Components teams.

HELICOPTER PROJECTS

The Helicopter Projects division at Oceania Aviation carries out a broad scope of work, from both line and heavy maintenance, through to helicopter upgrades and refurbishments, reconfigurations, and customization work. According to Tony Riley, the Helicopter Projects Manager: "We definitely see a good mix of projects coming into the hangar. Many projects are from customers that want to add functionality to their existing aircraft or that have recently acquired a helicopter and require upgrades to suit their mission type. We also carry out a number of major inspections and these projects often come with additional requirements for interior or exterior customization". Many upgrade projects require paint restoration work or full repaints, which the team can facilitate on behalf of the customer.

Alongside individual customer jobs, a recently finalized fleet management partnership with Air Methods in the USA (facilitated through Oceania's parent company Salus Aviation and US-based sister company Heli-Parts Nevada) means that the Helicopter Projects team is now seeing a steady stream of Airbus helicopters come through the hangar for reconfiguration and refurbishment, which then become available for sale. The majority of aircraft that go through customization and completion for immediate sale tend to go overseas, given the scale of the international market. During this process, the Oceania team manage the export process on behalf of the buyer or seller, looking after everything from gaining Export C of A via the NZCAA, to organizing freight and logistics for the aircraft.

When it comes to aircraft types, Oceania's Part 145 scope means that it can work on projects across most turbine powered helicopters. It sees high demand for Airbus, Bell, and MD aircraft, although larger types also come through the hangar. Recent projects include a 12-year inspection and a new full interior fit out for an EC120, two BO-105s which went through completion and Export C of A for sale into Russia, and the 12-year inspection and upgrade of an AS350B3+. "It's an exciting part of the industry to be involved in," says Tony. "A recent S-76B project proved a great challenge, starting with translating its Japanese Logbooks! We carried out its 3000hr/5-year inspection and fitted a new leather interior. It was extremely rewarding being able to fly the end result".

ROLE EQUIPMENT MANUFACTURING AND DESIGN

Oceania Aviation's Airborne Systems division also occupies significant premises within the Helicopter Projects hangar. This is where the team develop, manufacture, test and gain certification for

*** One of Oceania Aviation's very popular Spray Systems in action courtesy of Helisika.**

a wide range of role equipment which allows operators to increase revenue and expand their mission capabilities. The Part 148 certified Manufacturing division was established as a direct result of industry demand within New Zealand for specialist role equipment and has since expanded significantly, with a high proportion of customer demand coming from international markets including the USA, Asia and Australia. One of the factors that makes the team's offerings so unique is that when developing new systems, they collaborate with the operator throughout the entire process - from the very first design prototype, right the way through to the final manufacture and installation of the role equipment. This means that key operator requirements are comprehensively met, from cost-efficiency through to safety and optimal functionality.

The Airborne Systems team have developed and gained certification (working closely with approved Part 146 companies) for a number of unique role equipment products, including spray systems, cargo pods, pilot seat shift kits, cargo hooks, bike racks and more. Thanks to particularly high industry demand from Airbus Helicopter operators, it holds Supplementary Type Certificate's (STCs) and specializes in AS350 equipment – offering ready-to-order (and customizable) AS350 cargo pods, seat shift kits, bike racks and spray systems. Its NZCAA STCs are automatically accepted in Australia and have been validated in several countries throughout Asia as well as the USA, thanks to bilateral agreements with fellow regulatory bodies. The AS350 cargo pods are already both FAA and Transport Canada approved, and due to ongoing requests, the team will shortly be working on FAA validation for their AS350 spray system.

According to Tony Van Tiel, manager of the Airborne Systems division: "The customer is at the core of everything we do. It is important that we work with the operator throughout the entire development process, making sure that we manage costs to the customer's expectations and ensure that they walk away happy, and will return time and time again."

* Duncan Moxon aka 'Moxy' putting the finishing touches on a gearbox.

DYNAMIC COMPONENT OVERHAUL

Occupying a slightly smaller footprint, but still an extremely valuable and busy facility, is Oceania Aviation's Helicopter Components workshop. The highly specialized and factory-trained team led by Duncan Moxon deliver comprehensive overhaul, inspection and repair services across a wide range of component types, including main and tail rotor gearboxes, swashplates, mast assemblies, rotor hubs and hydraulic servos. In terms of OEM capabilities, the Components team specialize in the repair and overhaul of MD Helicopters, Bell, Schweizer and Dunlop components – as well as carrying out calendar inspections on AS350 components. The workshop's in-house NDT facility allows all components going through servicing to be thoroughly inspected for underlying issues, ensuring the highest quality work and results.

The customer base of the Components workshop is currently skewed slightly towards Australia, the Pacific and New Zealand, with the team able to provide overnight freight for customer and lease/exchange modules throughout the Pacific region. A number of Components customers in other countries within Asia-Pacific recognize that it can be extremely time-efficient and cost effective to send their components down to New Zealand for overhaul and repair. This is especially the case in today's current environment, with international freight channels still functioning well and New Zealand able to operate at full capacity when compared to other markets.

In component repair and overhaul, timing is of extreme importance and Oceania Aviation understands that any time for an aircraft spent on the ground translates to lost revenue. This is why the Components team prides itself on superior turnaround times as well as offering a comprehensive pool of exchange and lease modules, which effectively reduce any AOG for customers. The team offers a range of customized repair solutions for component work, including the ability to repair on-site (rather than in the Auckland workshop) if required, which can further save on downtime. Their primary goal is to get the customer back in the air as fast as possible, while ensuring a quality and cost-effective overhaul solution.

THE ONE-STOP SHOP CONCEPT

While Oceania Aviation's Helicopter Projects hangar specializes in custom projects, manufacturing and component overhaul, its vast capabilities and facilities across other aftermarket services and locations mean that Oceania Aviation has the unique ability to act as a turnkey aviation support provider. Just across the airfield from the Helicopter hangar is a custom-built Blades facility, as well as Oceania's Avionics division, Fixed-Wing maintenance hangar and Turbine Engines workshop. Instead of having to work with multiple providers to have their aircraft serviced, Oceania Aviation's customers save both time and money by allowing the MRO provider to look after their aircraft from nose-to-tail, so they can simply look after flight operations while leaving the rest to the experts.

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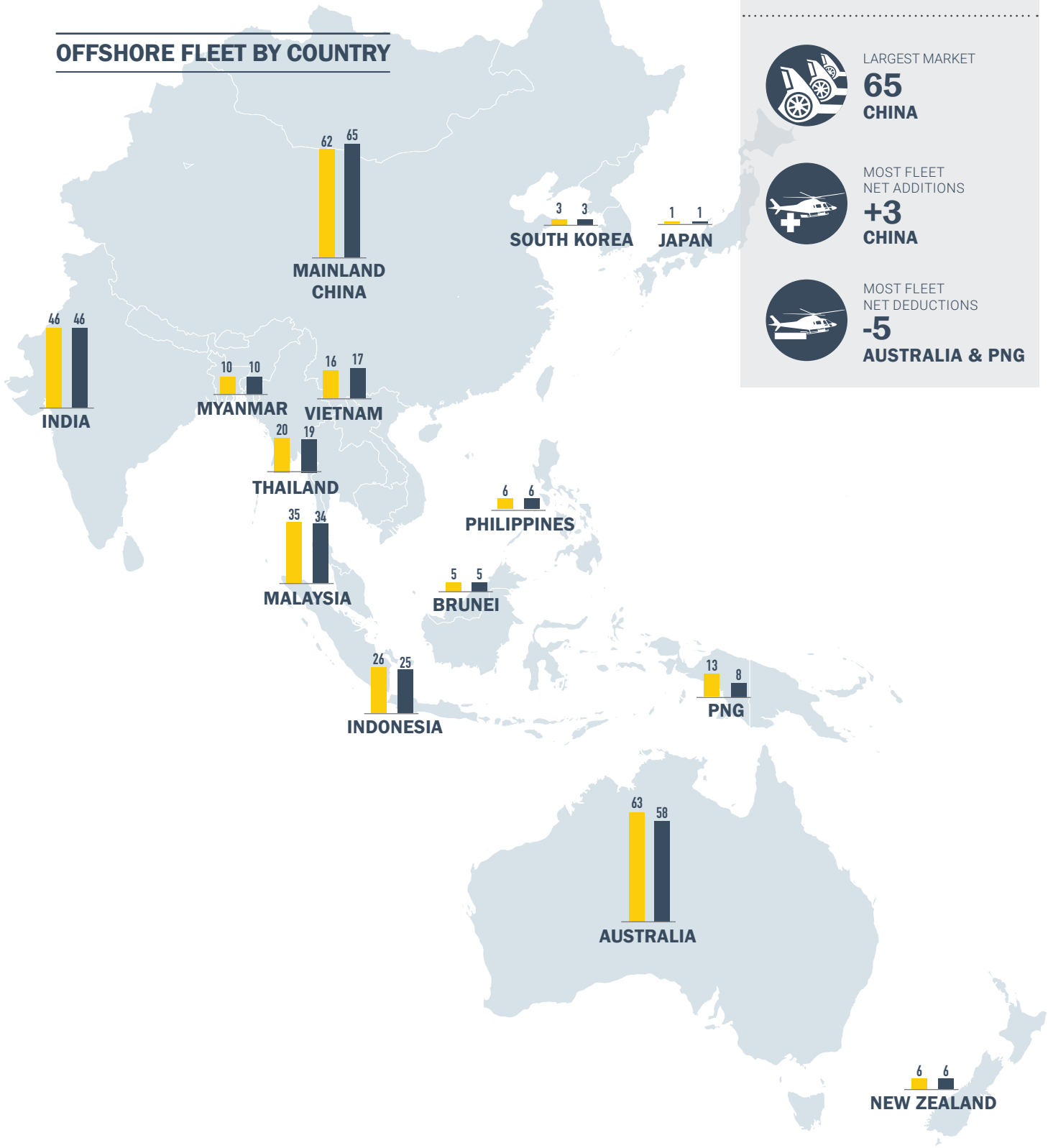
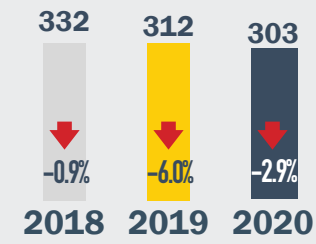
MARKET UPDATE:
OFFSHORE MARKET

OFFSHORE FLEET BY COUNTRY





LARGEST MARKET
65
CHINA

MOST FLEET NET ADDITIONS
+3
CHINA

MOST FLEET NET DEDUCTIONS
-5
AUSTRALIA & PNG

THERE WERE 303 CIVIL TURBINE HELICOPTERS DEDICATED FOR OFFSHORE OPERATIONS IN THE ASIA-PACIFIC REGION AT THE END OF DECEMBER 2020 – A DECREASE OF NINE UNITS (A DROP OF ABOUT 2.9%) SINCE 2019. THE OFFSHORE FLEET MAKES UP AROUND 7% OF THE TOTAL CIVIL TURBINE HELICOPTER FLEET IN TERMS OF UNITS, HOWEVER IT REPRESENTS ABOUT 16% OF THE TOTAL FLEET IN TERMS OF FLEET VALUE.

OFFSHORE FLEET REGIONAL DISTRIBUTION

Country/Region	Fleet Size (Units)	Replacement Cost ($M)
MAINLAND CHINA	65	1,401
AUSTRALIA	58	956
INDIA	46	610
MALAYSIA	34	607
INDONESIA	25	342
THAILAND	19	319
VIETNAM	17	319
MYANMAR	10	147
PNG	8	89
PHILIPPINES	6	63
NEW ZEALAND	6	70
BRUNEI	5	129
SOUTH KOREA	3	43
JAPAN	1	12
TOTAL	**303**	**$5,104**

Note (1): 'Replacement Cost' figures are based on the assumption that all existing helicopters would be replaced by the latest versions of their particular OEM variant and at 2020 list price.

Many industry experts were confident that 2020 would be the year that O&G market started its long-awaited rebound. The industry, which had been struggling due to the ongoing downturn in O&G and overcapacity of heavy helicopters, saw major changes in 2019 – Waypoint's bankruptcy filing and subsequent acquisition by the Macquarie Group, as well as similar filings and restructurings by US-based operator PHI and Bristow Group. Additionally, the escalating tensions due to the trade war between the US and mainland China threatened global economic growth, leading to lower demand, and thus lowering the price of oil. Several operators placed helicopters in storage or changed mission configurations for more profitable operations, resulting in a decrease in offshore configured helicopters.

However, 2020 was expected to be the year that the O&G market put the worst behind it and slowly began its rebound. The change was not expected to be overnight or even a full-blown revival, but rather a slow and steady improvement. No one however was ready for what happened next – 2020's

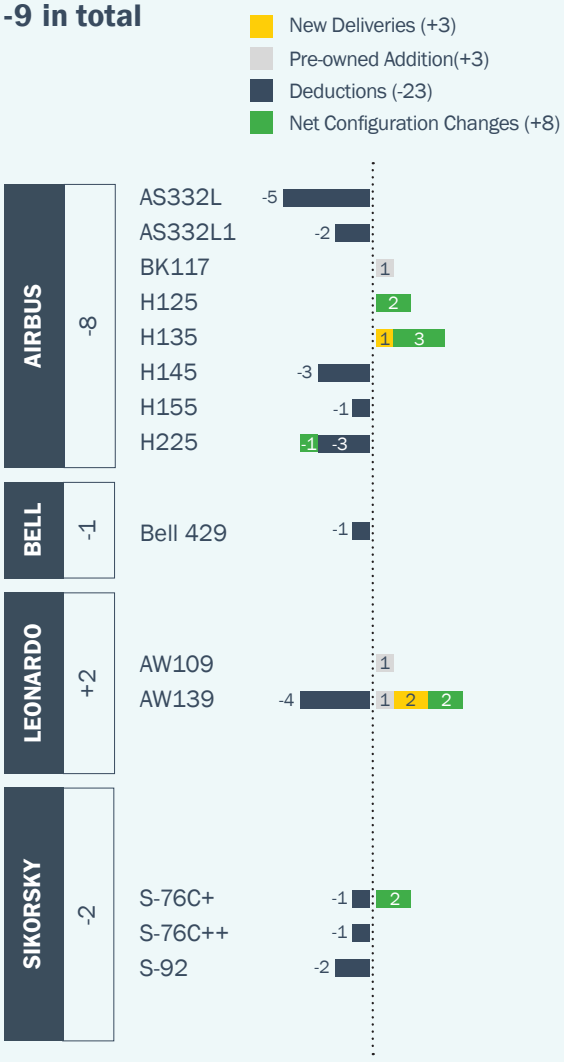
COVID-19 pandemic. The coronavirus quickly swept across the world, infecting millions, and crippling the world economy. The virus was so deadly and far-reaching that we are still, even a year after it was declared a pandemic by the World Health Organization, seeing its effects.

The pandemic derailed the global economy from its projected growth and forced several countries across the globe to enter recession, and as a result, the demand for oil plummeted and the O&G industry suffered further.

The offshore configured helicopter fleet flew two different types of missions in Asia-Pacific. The majority, 286, flew O&G missions. This was 19 (6%) fewer than in 2019, which can largely be attributed to the crash in oil prices.

Additions and Deductions by Model

-9 in total



The remaining 17 helicopters flew Marine Pilot Transfer missions. This was a huge jump of 140% over the seven helicopters in 2019.

The nine net deductions in 2020 were attributed to three new deliveries, three pre-owned additions, 23 deductions and eight net mission changes to offshore (most of the changes were for Marine Pilot Transfer). Australia and Papua New Guinea accounted for the largest offshore fleet deductions in 2020 – five each.

Airbus and Leonardo remained the most popular OEMs in terms of market share, with a fleet of 110 helicopters (36%) and 83 helicopters (27%), respectively. Sikorsky came third, with a fleet of 79 helicopters (26%), followed by Bell with 26 helicopters (9%).

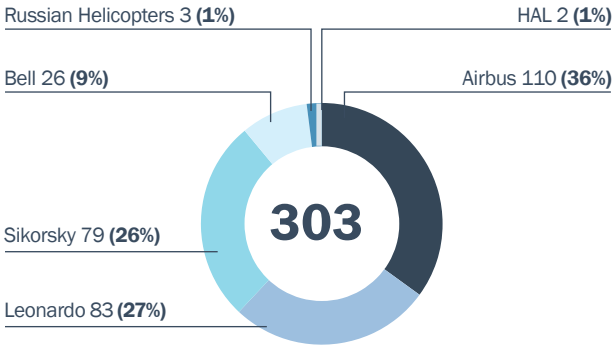
There were 65 Leonardo AW139 helicopters used for offshore operations in 2020 – the single most used offshore helicopter model in the Asia-Pacific region. The Airbus AS365 and Sikorsky S-92 were the second and third most popular offshore models, with 32 and 31 helicopters, respectively.

Mainland China experienced the largest net addition of offshore helicopters in 2020 – by three units. The net fleet changes in 2020 helped mainland China overtake Australia as the country with the largest offshore helicopter fleet – 65 units (21% of the total offshore fleet). Australia dropped to second place with 58 offshore helicopters (19%), followed by India in third spot with 46 (15%).

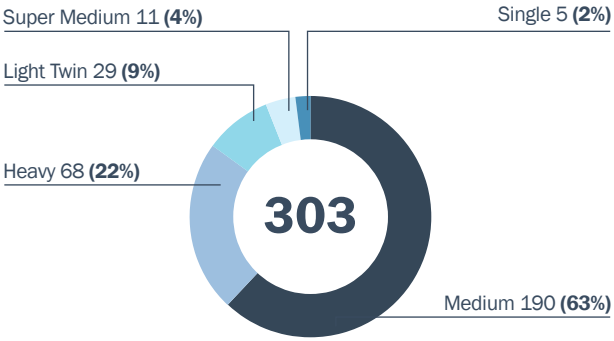
Citic Offshore Helicopter Co. (COHC), which was 2019's largest Asia-Pacific offshore operator with 39 offshore helicopters, saw an increase in its offshore fleet by one, and retained its top position in 2020. Malaysia-based Weststar Aviation grabbed the second spot with the addition of two helicopters in 2020 and now has a total of 21 helicopters in its fleet. India-based Pawan Hans, Vietnam-based Vietnam National Helicopters, Australia-based PHI jointly came third with 17 offshore helicopters each.

The year 2020 has not been kind to the O&G industry, with the dramatic drop in oil prices putting many companies at risk of going bankrupt before the global economy has the chance to pick up again. Several countries have developed COVID-19 vaccines and started vaccinating their populations. The global economy is expected to recover as vaccinations become more readily available and as the pandemic reaches its much-awaited end. However, despite there being light at the end of the tunnel, a complete COVID-19 free world is not expected to be achieved till at least the end of 2023, if not longer. Thus, 2021 is not expected to provide any relief for the offshore operators, and the survival of many companies will be at risk, leading to further reductions inthe Asia-Pacific offshore fleet.

OFFSHORE FLEET BY OEM



OFFSHORE FLEET BY SIZE CATEGORY



OFFSHORE FLEET BY OPERATOR (5 OR MORE HELICOPTERS)

5 Helicopters

40	COHC	9	Travira
21	Weststar	9	Pelita
17	PHI	8	Heli-Union
17	Pawan Hans	8	TAS
17	VNH	7	China GA
16	China Southern GA	7	Heligo
16	Global Vectra	6	SFS
13	MHS	6	Pacific Helicopters
11	CHC	5	UOA
10	Aviator Group	5	Esso
9	Babcock	5	Shell Brunei
		5	Hevilift

OFFSHORE FLEET BY MODEL AND COUNTRY/REGION

		MAINLAND CHINA	AUSTRALIA	INDIA	MALAYSIA	INDONESIA	THAILAND	VIETNAM	MYANMAR	PNG	PHILIPPINES	NEW ZEALAND	BRUNEI	SOUTH KOREA	JAPAN	TOTAL
AIRBUS	AS332L	1														**1**
	AS332L1	6														**6**
	AS332L2				3			3								**6**
	AS355				1						2					**3**
	AS365	2	3	21		3			2		1					**32**
	BK117		1			1				3		1				**6**
	H120			1												**1**
	H125		3													**3**
	H135		6								1					**7**
	H145		2							1		1				**4**
	H155	14						4								**18**
	H175		2													**2**
	H225	12			5			4								**21**
BELL	Bell 205											1				**1**
	Bell 212									3						**3**
	Bell 214		1													**1**
	Bell 412		1	14		4									1	**20**
	Bell 430					1										**1**
HAL	Dhruv			2												**2**
LEONARDO	AW109	2	7													**9**
	AW139	2	17	8	15	5	8		3		2	3	2			**65**
	AW189		2		4			3								**9**
RUSSIAN HELICOPTERS	Mi-171							3								**3**
SIKORSKY	S-76A					1										**1**
	S-76A+													1		**1**
	S-76C				4				1							**5**
	S-76C+	2					3							2		**7**
	S-76C++	11			2	10	1		4	1						**29**
	S-76D						5									**5**
	S-92	13	13				2						3			**31**
	Total	**65**	**58**	**46**	**34**	**25**	**19**	**17**	**10**	**8**	**6**	**6**	**5**	**3**	**1**	**303**

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SPECIAL FEATURE:

OFFSHORE WIND ROTORCRAFT – THE ENERGY TRANSITION IS UPON US

Offshore wind has become a major global industry with many multi-billion-dollar projects being constructed every year. As these projects become larger and further from shore rotorcraft have become a key part of the supply chain in construction and maintenance. Whilst OEMs have been quick to highlight the potential for the sector as a major new growth opportunity for rotorcraft.

Steve Robertson and George Venturas of Air & Sea Analytics share their thoughts on the emerging opportunity for rotorcraft in the offshore wind business.

Air & Sea Analytics has published a new report that takes a 'deep dive' into the offshore wind rotorcraft sector. The report is intended to provide the industry with a view of the current status and outlook for the offshore wind rotorcraft market. Air & Sea Analytics has partnered with Asian Sky Group under an exclusive MOU that covers the Asia-Pacific markets and is delighted to share the headline outcomes from the latest study.

Offshore wind has become a major global industry with many multi-billion-dollar projects being constructed every year. As these projects become larger and further from shore rotorcraft have become a key part of the supply chain in construction and maintenance. Whilst OEMs have been quick to highlight the potential for the sector as a major new growth opportunity for rotorcraft, the industry has been somewhat opaque in recent years with little clarity on how many aircraft are currently servicing the industry (last year estimates from third parties ranged from 11-40 aircraft) and how many are required in the future.

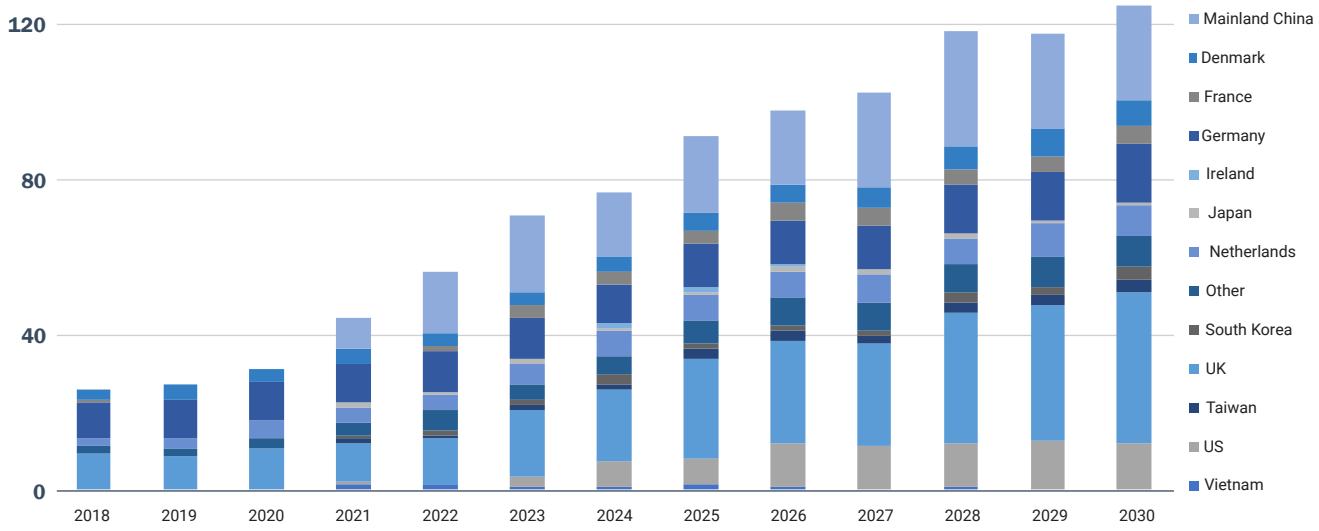
The purpose of the latest research from Air & Sea Analytics is to explain the drivers of demand for this important sector, build a forecast of future activity based on a granular project by project analysis and translate this to demand for rotorcraft.

A RENEWABLE ENERGY REVOLUTION IS UPON US

The scale of renewable energy projects of all types has been increasing as the technology matures. Offshore, in contract to other technologies (such as wave and tidal devices) the wind industry has matured well with proven technology and a consolidated supply chain of OEMs and engineering contractors. Individual projects have grown in scale to become, in many cases, multi-billion dollar 'mega projects' that attract global engineering and service companies. The days of 'cottage industry' are long gone.

Over the next ten years we expect to see over half a trillion dollars of investment in the offshore wind business (based on currently-visible projects). In a 'good year' the upstream oil business might see this sum of Capex in a single year. Depressed oil prices in 2020, however, pushed investment to a low of $300 billion.

NEARLY 100 ADDITIONAL HELICOPTERS WILL BE REQUIRED BY 2030



The energy landscape is changing. Oil is a mature business in most countries, past peak production and becoming more expensive to extract each marginal barrel. Meanwhile the costs of extracting energy from renewable sources is falling to the point where it is cost-competitive for grid connected power generation vs nuclear or hydrocarbon-powered alternatives. Latest estimates from the Department for Business, Energy and Industrial Strategy (BEIS) in the UK forecast that offshore wind projects over the next decade will produce power at an average cost of £47 per megawatt-hour (MWh) compared to £82 per MWh for new gas projects and £92 per MWh for new nuclear.

These latest projections (as of August 2020) are a material improvement on previous expectations (£103 per MWh). If £47 per MWh seems fanciful, bear in mind that projects have already moved forward at even lower prices than this.

The Second Round (2017) UK Contract for Difference (CfD) auction results resulted in two offshore wind projects (Hornsea 2 and Moray Offshore) securing CfDs at a strike price of £57.50, and a third project (Triton Knoll) securing a price of £74.75.

The Third Round Results were announced in 2019 and awarded 12 projects, including 5.5 gigawatts (GW) of offshore wind projects at record low prices as low as £39.65 ($50.05). For comparison, wholesale UK electricity prices have fluctuated between £35 and £65 in recent years.

OFFSHORE WIND IS A HIGH-GROWTH, COST-COMPETITIVE POWER GENERATION SECTOR

Whatever your pre-disposition, the indisputable fact is that the costs of extracting energy from renewable sources is falling to the point where it is cost-competitive for grid connected power generation vs nuclear or hydrocarbon-powered alternatives. Latest estimates from the Department for Business, Energy and Industrial Strategy (BEIS) in the UK forecast that offshore wind projects over the next decade will produce power at an average cost of £47 per megawatt-hour (MWh) compared to £82 per MWh for new gas projects and £92 per MWh for new nuclear.

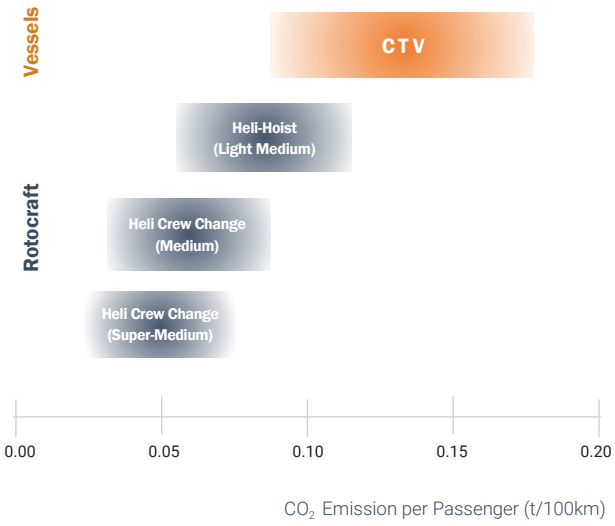
OFFSHORE WIND IS ENTERING A PERIOD OF SUBSTANTIAL GROWTH IN CAPACITY

In our research we have identified a substantial volume of offshore wind farm projects that we believe will be built between 2020 and 2030. A total of 467 projects are forecast with 267 GW total capacity which will bring overall installed offshore windfarm installed capacity to over 300 GW by 2030. This will require expenditure of over half a trillion dollars and will establish offshore wind as a major industrial activity in its own right. It is already attracting some of the world's largest equipment manufacturers and engineering contractors.

ROTORCRAFT OFFER THE LOWEST CARBON METHOD OF CREW TRANSFER

Having analysed the costs and benefits of transporting crew offshore we believe that rotorcraft are a commercially-

ROTORCRAFT OFFER THE LOWEST CARBON METHOD OF CREW TRANSFER



attractive proposition to support both the construction and operation of offshore wind farms. Furthermore, we understand that crew transportation by rotorcraft will offer the lowest CO2 per passenger mile of any currently available option and the highest availability to the end user, providing that latest generation aircraft are used.

Available data confirm that rotorcraft are by-far the safest method of transporting personnel offshore and that many of the leading windfarm OEMs and operators are well-aware of this and are recruiting rotorcraft specialists and building helicopters into their future windfarm plans.

NEARLY 100 ADDITIONAL HELICOPTERS WILL BE REQUIRED BY 2030

We expect the market will continue to favour the latest light-medium and medium aircraft. The Airbus H145 and Leonardo AW169 models are likely to dominate, along with the smaller Airbus H135. In construction-support we expect to see medium helicopters such as the AW139 and (in the fullness of time) the H160. Larger 'super medium' aircraft such as the H175 have previously been used in support of offshore wind construction and may well be used in the future in this application, likewise, the largest offshore rotorcraft such as S-92 could be used in some construction support applications where helidecks allow.

In China the H135 is expected to find work in 2021 with COHC as two units enter service and more are expected to follow including domestic production.

Our 'bottom-up' modelling process anticipates that the offshore wind rotorcraft fleet will grow from 27 to 126 over the period to 2030 (CAGR of 17%). The fleet will remain smaller than many other comparable areas such as oil & gas but will still represent a robust and growing opportunity to deploy modern light medium twin helicopters.

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"We are very happy with the size of the show... and the great diversity of delegates that came to visit us – from different countries and industries; commercial and government entities, many of whom had specific problems that we could provide solutions for."

"The quality of visitors is great. We have been very impressed with...

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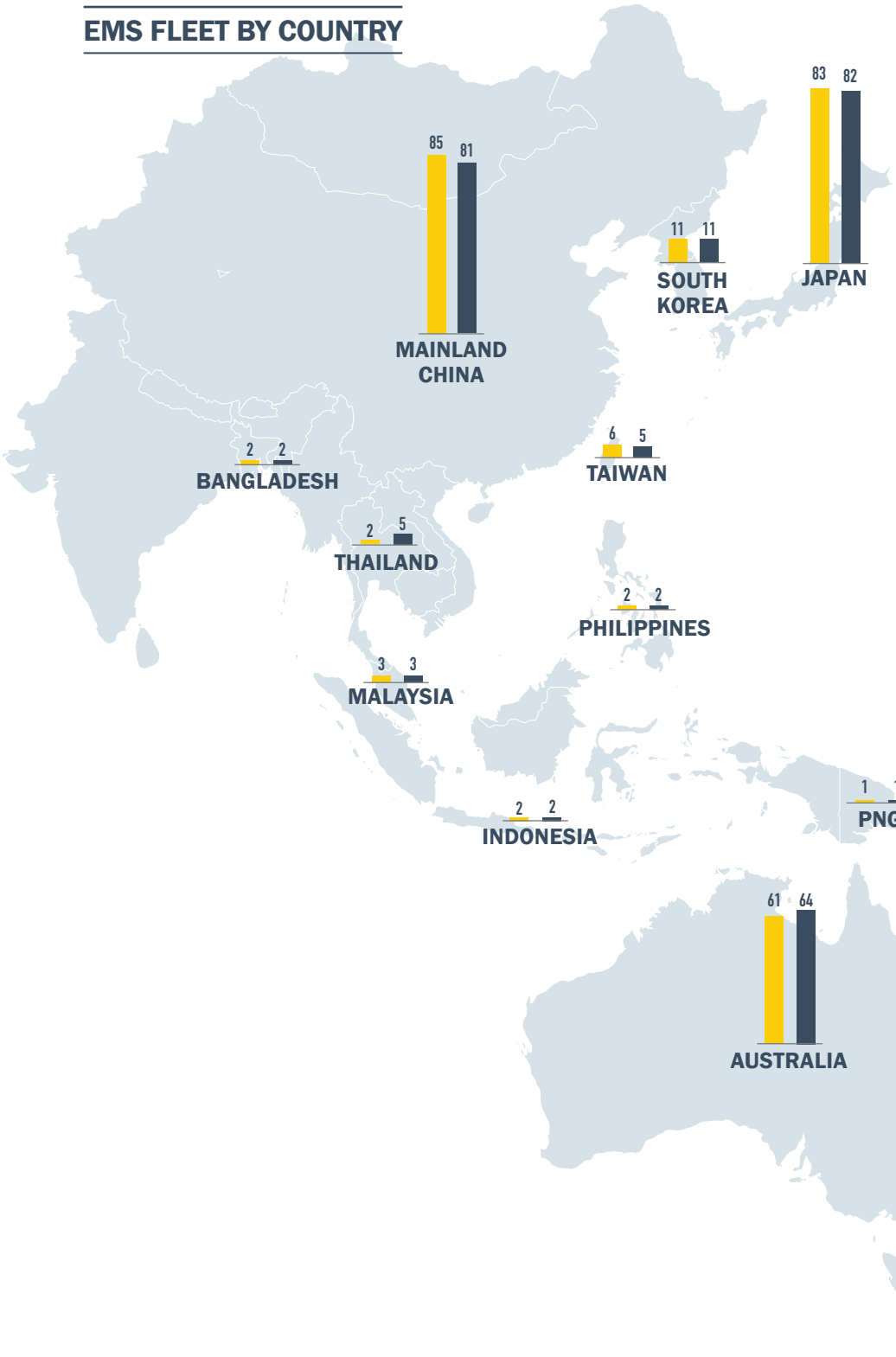
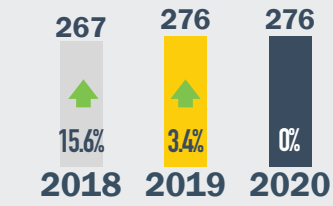
MARKET UPDATE:
EMS MARKET

EMS FLEET BY COUNTRY

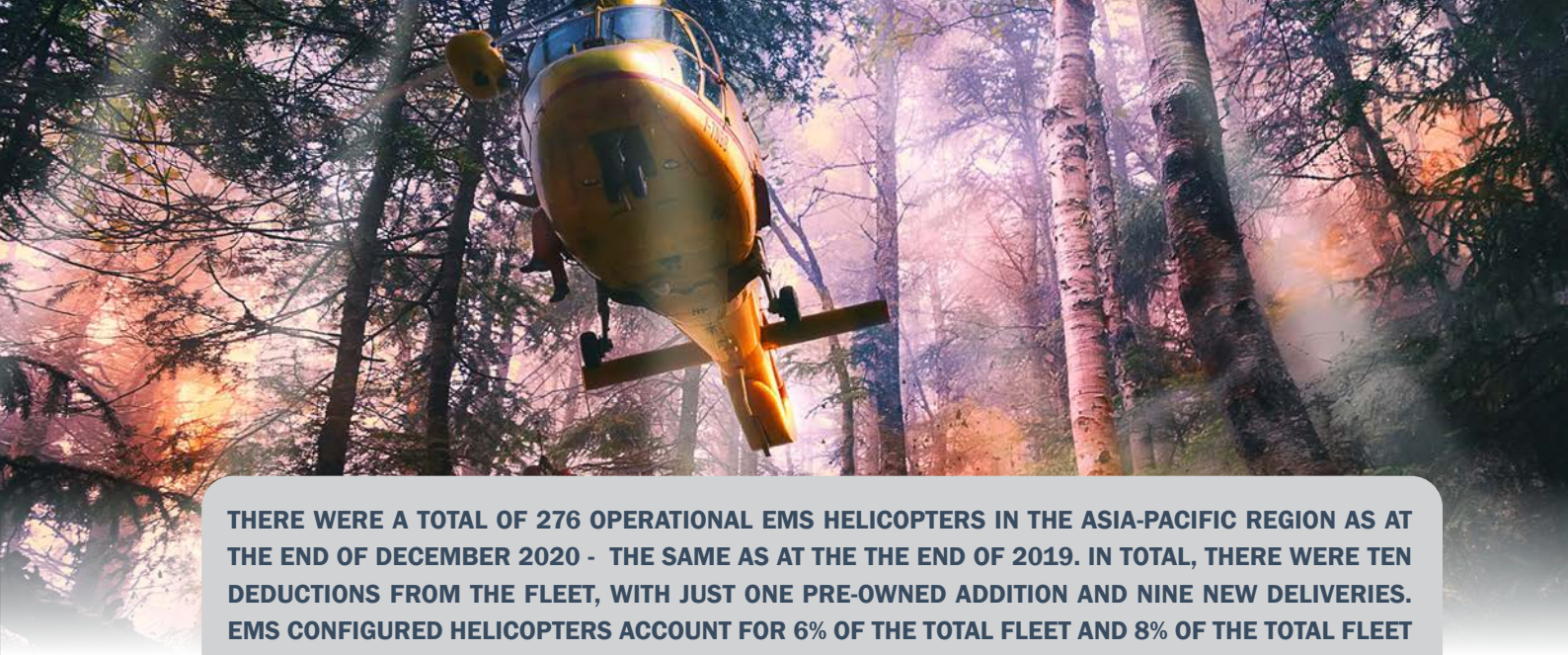




LARGEST MARKET
82
JAPAN

MOST FLEET NET ADDITIONS
+3
THAILAND & AUSTRALIA

MOST FLEET NET DEDUCTIONS
-4
MAINLAND CHINA



THERE WERE A TOTAL OF 276 OPERATIONAL EMS HELICOPTERS IN THE ASIA-PACIFIC REGION AS AT THE END OF DECEMBER 2020 - THE SAME AS AT THE THE END OF 2019. IN TOTAL, THERE WERE TEN DEDUCTIONS FROM THE FLEET, WITH JUST ONE PRE-OWNED ADDITION AND NINE NEW DELIVERIES. EMS CONFIGURED HELICOPTERS ACCOUNT FOR 6% OF THE TOTAL FLEET AND 8% OF THE TOTAL FLEET VALUE. THE EMS MARKET REGISTERED DOUBLE DIGIT GROWTH FIGURES FOR THREE YEARS UNTILL 2018, BUT SLOWED TO 3% IN 2019 AND SAW NO GROWTH AT ALL IN 2020.

EMS FLEET REGIONAL DISTRIBUTION

Country/Region	Fleet Size (Units)	Replacement Cost ($M)
JAPAN	82	628
MAINLAND CHINA	81	480
AUSTRALIA	64	818
NEW ZEALAND	17	180
SOUTH KOREA	11	121
TAIWAN	5	56
MALAYSIA	5	42
BANGLADESH	3	17
THAILAND	2	14
INDONESIA	2	7
PHILIPPINES	2	17
VANUATU	1	6
PNG	1	6
TOTAL	**276**	**$2,393**

Note (1): 'Replacement Cost' figures are based on the assumption that all existing helicopters would be replaced by the latest versions of their particular OEM variant and at 2020 list prices.

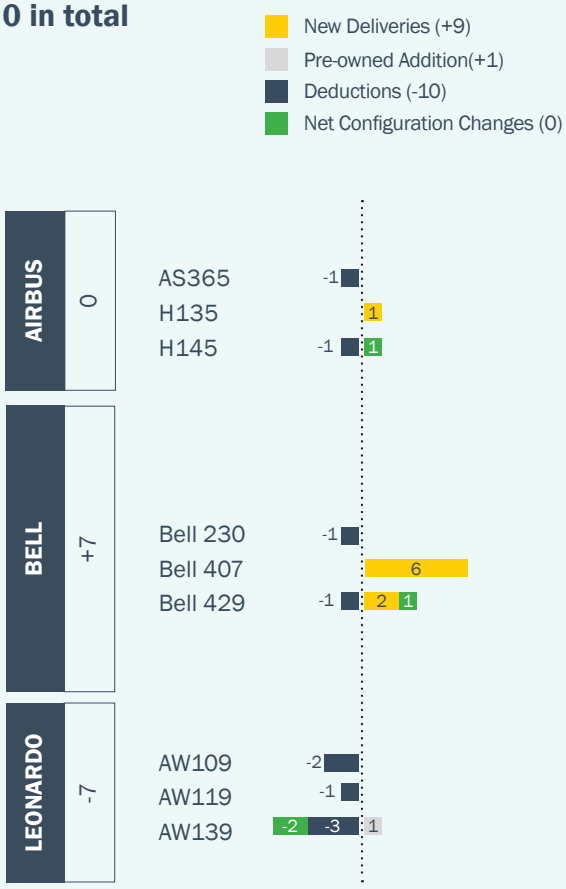
EMS plays a crucial role in the medical service sector by providing emergency relief and rescue operations. These helicopters are not limited by geography or weather conditions and help provide emergency relief to remote areas with complex terrain. EMS helicopters can facilitate quick transport to nearby locations and are much faster than ground-based medical transport. In critical cases this can dramatically increase the chance of survival of patients.

One of the most common types of EMS operations originated from the United States, which has a competitive market, diversified financing resources, and is heavily driven by demand. Germany is also of note, as it only has three government-authorized service providers, compulsory medical insurance, and a helicopter prehospital-rescue system - a plan for health care provided on-scene at a medical emergency or major incident, and during transfer of patients to care facilities.

Japan was the market leader with 82 EMS helicopters in 2020. The Japanese Congress set in law procedures for helicopter EMS operations to ensure the smooth operation by provinces and the first aid centers of hospitals. Being on the edge of the Pacific Ring of Fire, Japan is prone to natural disasters and, as such, the EMS segment is of paramount importance in the country. In

Additions and Deductions by Model

0 in total



addition, the expense of operating EMS helicopters is absorbed by the local government.

Mainland China, ranked second with 81 EMS helicopters in 2020. Mainland China was the main driver of growth of the EMS market between 2018 and 2019, with Kingwing in particular growing its market share. In 2020, several new operators entered the EMS market. However, despite new entrants, with the tough operating conditions in 2020, Kingwing grounded at least 29 helicopters. 2020 was a bad year for EMS operations in mainland China, with at least 38 helicopters grounded or stored during the year, taking 47% of the total EMS capacity out of the market.

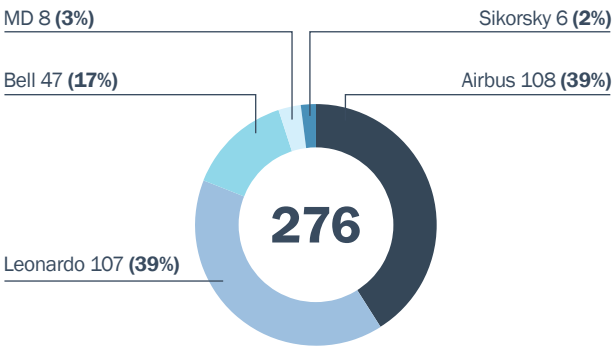
With a fleet of 64 helicopters dedicated for EMS operations, Australia had the third largest EMS market in APAC. In Australia, only one institution is authorized by the government to take charge of EMS services. In addition, with a vast landmass and a low population density, transport of those people in need by helicopter is much more efficient. Moreover, between 16 – 80% of the total cost of operating EMS helicopters is subsidized by the central government.

Together, these three countries represent around 83% of the EMS market in the region.

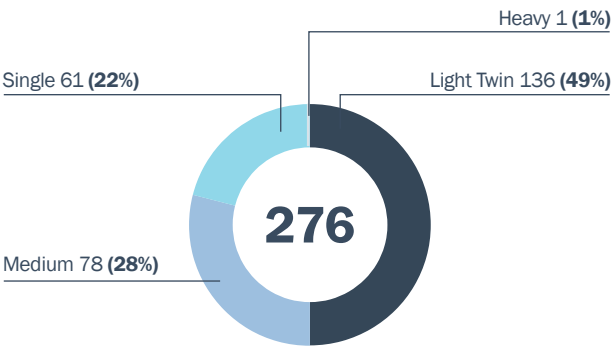
The Airbus H135 was the most popular EMS helicopter model in the Asia-Pacific region in 2020 – 42 units (15% of the total EMS fleet), the majority of which were in operation in Japan (34 units). Leonardo's AW139 was the second most popular – with 39 (14% market share) units.

EMS FLEET BY OPERATOR (5 OR MORE HELICOPTERS)

EMS FLEET BY OEM



EMS FLEET BY SIZE CATEGORY



EMS FLEET BY MODEL AND COUNTRY/REGION

		JAPAN	MAINLAND CHINA	AUSTRALIA	NEW ZEALAND	SOUTH KOREA	TAIWAN	THAILAND	MALAYSIA	INDONESIA	BANGLADESH	PHILIPPINES	OTHERS	PNG	TOTAL
AIRBUS	AS365			2			2								4
	BK117	7		6	9										22
	BO105								3				1	1	5
	H125		1	1	1										3
	H130		6								2				8
	H135	34	8												42
	H145	19		1				2							22
	H155					1									1
	H225					1									1
BELL	Bell 206			2						1		1			4
	Bell 222				1										1
	Bell 407		14												14
	Bell 412			19						1					20
	Bell 429	5						3							8
LEONARDO	AW109	11	14			5									30
	AW119		30												30
	AW139		8	31											39
	AW169				1	4	3								8
MD	MD 500			2											2
	MD 900	6													6
SIKORSKY	S-76A				3							1			4
	S-76C++				2										2
	Total	**82**	**81**	**64**	**17**	**11**	**5**	**5**	**3**	**2**	**2**	**2**	**1**	**1**	**276**

COMPANY PROFILE:

PRATT & WHITNEY IS COMMITTED TO POWERING CHINA'S AVIATION GROWTH

GO BEYOND

Expanding aviation capacity in a nation as large and geographically diverse as China, with a vast population increasingly predisposed to mobility, is fundamental in supporting a modern and diversified domestic economy, as well as a productive and prosperous citizenry. As a vital player in the growth of aviation in China, we are proud to be at the forefront.

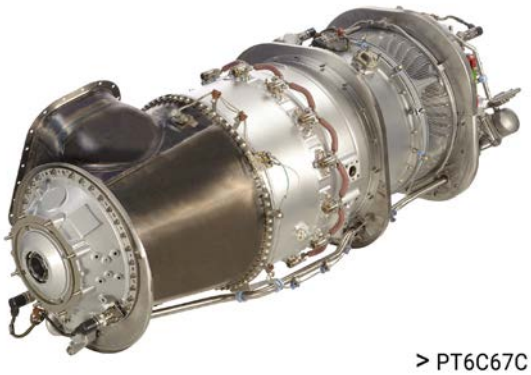
It was some 90 years ago when Pratt & Whitney made its first foray China; today, we are strongly anchored here. Modern China is the most populous country in the world with some 1.4 billion people. Expected of a country spread over some 9.6 million square kilometers, China features just about every geographic and climate profile found on earth.

RICH POTENTIAL

From short-haul regional flights to longer-haul domestic and international routes, China represents a market that is exceptionally rich in potential for the host of Pratt & Whitney-powered fixed-wing aircraft flying, along with the auxiliary power units (APUs) we also manufacture. Another exciting opportunity lies in the various helicopter platforms that we power and their increasing application in the country.

We power helicopters from the major airframe OEMs operating around the world. One common attribute of these helicopters is their versatility – their ability to adapt to many different commercial missions ranging from medical rescue to VIP transport, and from utility to law enforcement, and much more. The helicopters we power boast exceptional dispatch reliability based on engine availability rates that score consistently above industry benchmarks.

We have been designing, manufacturing and servicing helicopter engines for more than 50 years. We offer a modern portfolio of five helicopter engine families, certified in 36 different models having produced roughly 17,500 helicopter engines, more than 10,000 still flying today. In China, we have more than 500 helicopter engines powering aircraft, and we are confident that number will increase as aviation expands across the country.



> PT6C67C

A FEW EXAMPLES

The PT6T engine – known as the TwinPac™ – was our first helicopter engine, and now has some 46 million flight hours to its credit. It has powered numerous helicopters over the years, including the workhorse Bell 212 and Bell 412 models. The PT6C engine family, and the two key platforms it powers – the Leonardo AW139 and the Airbus H175 – enjoy widespread use in offshore

Airbus H135P3 (PW200 engines) is being adopted in China for emergency medical service needs, and for police surveillance. Airbus has recently established a final assembly line for its H135 in Qingdao.

transportation, as well as some key applications in emergency medical services (EMS), among other missions. The PT6B-37A is a direct descendent of the TwinPac™ and has found its most popular application powering the single-engine Leonardo AW119.

Around for more than 20 years, our PW200 engine remains the most popular for current light-twin helicopters. Our newest helicopter engine, the PW210 family, powers the new generation of twin-engine intermediate and medium-class helicopters, namely the Leonard AW169 and the Sikorsky S-76D. The innovation behind this engine even enables it to serve as the helicopter's APU.

RESPONDING TO GROWTH IN CHINA

Over recent years, Pratt & Whitney powered helicopters from Leonardo have taken an increasingly important position within China, including the AW139 and the AW119 (PT6 turboshaft engines) and the AW109 (PW200 engines).

Another light twin is the Bell 429 (PW200 engines) which has become popular in China and around the world for taxi, air charter and VIP transport.

Moreover, the Airbus H135P3 (PW200 engines) is being adopted in China for emergency medical service needs and for police surveillance. Airbus has recently established a final assembly line for its H135 in Qingdao.

Pratt & Whitney also powers the Sikorsky S-76D (PW210 engines) for search and rescue missions in the country, and we anticipate the likely arrival of the Kazan Helicopters Ansat later this year.

PERSONALIZED MAINTENANCE SOLUTIONS

Pratt & Whitney has traditionally excelled at developing maintenance solutions for its engines that are highly effective in targeting specific performance elements – including our Oil Analysis technology, now available for PT6C-67C/E, PT6T- and PW200-powered helicopters, and our digital engine health monitoring solution, FAST™, used by AW139 operators in China. By bringing these and other complementary services together, we are able to develop a holistic approach to engine maintenance, which is tailored to each engine depending on the mission profile and operating environment. We have also translated our maintenance manuals into many different languages, including Chinese, making it easier for our customers and maintainers to ensure the proper functioning of their aircraft. These are just some of the ways we are creating fully planned maintenance environments for our customers.

Our Chinese customers also appreciate our current turnkey pay-per-hour maintenance programs for single helicopters, two to five helicopters, and for fleets of six and above. Yet, we are continuing to explore new ways to meet evolving needs so that customers can focus on their mission needs, leaving the maintenance to us.

EXTENSIVE FOOTPRINT IN CHINA

As a long-term player in China, we have an extensive physical presence in five of the country's largest cities. This includes manufacturing and training centres and designated maintenance facilities (DMFs), with one – COHC Aviation Science and Technic Co., Ltd., in Shenzhen – for AW139 helicopters (PT6C engines).

We also have other facilities to service and support our APUs, PT6A and GTF engines, AMECO in Beijing, Shanghai Engine Center in Shanghai, China Flying Dragon in Harbin, and China Southern in Shenyang – all part of our global customer service network that also features field representatives dedicated to China and more than 100 mobile repair team technicians serving China and other countries where our customers operate.

We believe that we are better positioned than any other aviation engine manufacturer to help China and its industry realize its full potential. We remain committed to listening to our current and future customers across the country to ensure we have the right people, the right engines and the right services to meet their mission needs.

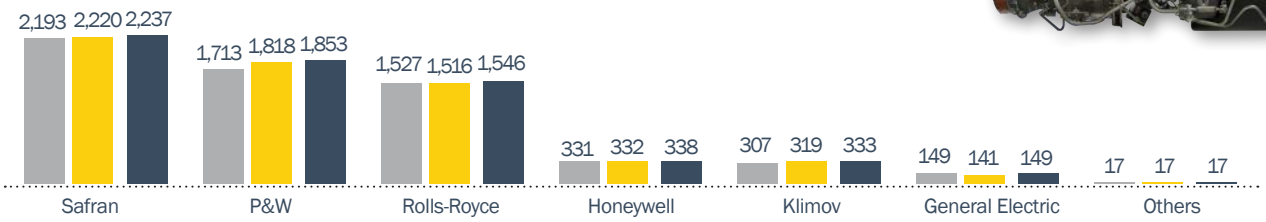
www.pwc.ca/China

Weibo Wechat

Fred Lefebvre
Vice President, Sales & Marketing

ENGINE OEM OVERVIEW

TOTAL ENGINE GROWTH

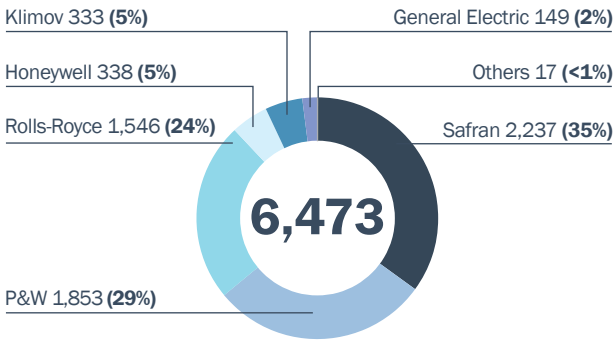


Asia-Pacific was home to 4,385 civil turbine helicopters, powered by a total of 6,473 turbo-shaft engines, as of the end of 2020. Safran remained the most popular engine OEM, accounting for 2,237 engines (35% of total) in the region. Pratt & Whitney and Rolls-Royce followed, with 1,853 engines (29% of total) and 1,546 (24% of total) engines, respectively. Pratt & Whitney experienced the largest net growth in the region – its number of engines increasing by 35 (a growth of around 2% since yearend 2019).

Safran, the most popular engine OEM in the region, powered 1,640 of the total 4,385 helicopters at the end of 2020. 47% and 30% of the helicopters using Safran engines belonged to the single and medium categories, respectively.

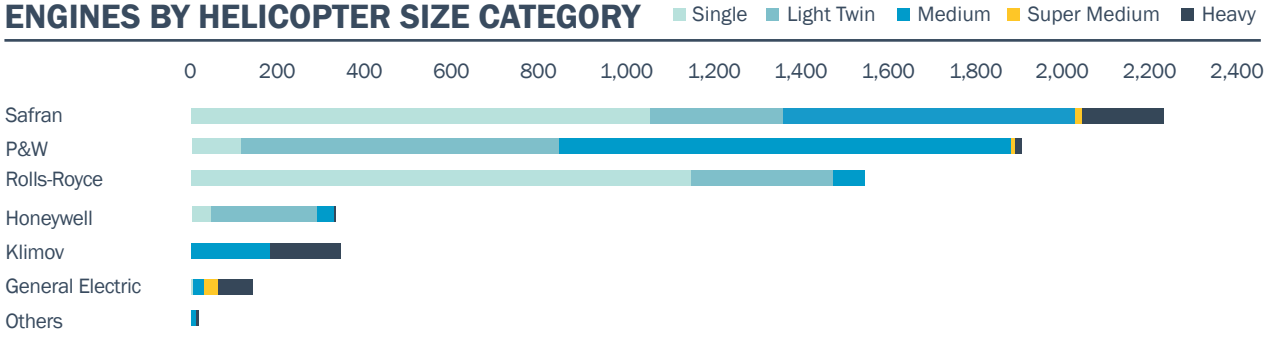
Safran's Arriel family is the most popular turbo-shaft engine model in Asia-Pacific, with 1,196 helicopters using 1,598 engines. Rolls-Royce's Allison 250 comes second, with 1,237 helicopters using 1,434 engines. With 525 helicopters using 914 engines, the PT6 was Pratt & Whitney's most popular engine family in the region.

ENGINE OEM MARKET SHARE



Overall, the market grew by just 1.7% in 2020, lower than its 2% growth in 2019. The market is expected to grow further in 2021, as the world recovers from the COVID-19 pandemic and helicopter operations revert to pre-COVID levels, thereby increasing the demand for helicopter travel.

ENGINES BY HELICOPTER SIZE CATEGORY



GO BEYOND

HELICOPTER AVIATION

SUPERIOR PERFORMANCE. FOR A HIGHER PURPOSE.

POWERING HELICOPTERS TO RISE ABOVE — AND ANSWER ANY CALL.

From search and rescue to firefighting to emergency response, Pratt & Whitney's industry-leading engines provide the power, speed and reliability to meet your objectives — and serve the greater good.

ELEVATE YOUR MISSION AT **PRATTWHITNEY.COM**

MAINTENANCE COST PROGRAMS:

INTERVIEW WITH MARK WINZAR, SVP OF BUSINESS DEVELOPMENT, EMEA & APAC, JSSI

In particular, a maintenance cost program is for engines, airframes, or APUs. The concept is simple: The aircraft operator pays a certain amount of money for each hour that the aircraft flies, with that money contributing towards the airframe, engine or APU's future maintenance requirements. This helps the operator's planning, as it allows them to build the maintenance payment into the fixed cost of a flight and establish more predictable operating costs, stabilize their maintenance budget and minimize out-of-pocket maintenance expenses.

To gain a better understanding of how maintenance contracts work, Asian Sky Media spoke with Mark Winzar, SVP of Business Development EMEA & APAC for JSSI (Jet Support Services, Inc.), a company that offers engine, APU and airframe coverage.

What are the maintenance programs offered by your company? What is the maintenance cost coverage?

The programs JSSI offers can be categorized into the following three types.

Engine

Vital scheduled and unscheduled maintenance protection for your engines is just a phone call away; from scheduled shop visits, airworthiness directives and service bulletins to catastrophic engine failure.

Airframe

Independent coverage for virtually every part, component, assembly, and system of the airframe, including all parts and labor for scheduled and unscheduled maintenance events.

APU

Comprehensive maintenance coverage for most makes and models of APU, including scheduled events and life-limited components (LLCs).

How can operators benefit by enrolling their aircraft/engine on your Program?

The benefits that JSSI's maintenance program offers are as follows.

Technical Expertise

- 30+ years of maintenance data, knowledge, and experience.
- 70+ regionally based Technical Advisors and Product Line Specialists.
- Dedicated team of airframe, avionics and engine professionals.

Independent Advocates

- Independent oversight throughout every maintenance event.
- Parts supply through JPL with global buying power to negotiate the best rates.
- Cost management and quality overview throughout.

Personalized Service

- Single point of contact; simply call, email, or text for assistance.
- Personal Client Relationship Manager and Technical Advisor with years of experience.
- 24/7 global support.

What kind of operators are most likely to enroll in maintenance programs?

"JSSI has customers across the full spectrum of operators, from one-aircraft operators to global large-scale operators, but each has common requirements. We act as independent advocates on behalf of each client, providing world class support when needed, as well as keeping maintenance costs under control.

With over 30 years of operational and maintenance data and more than 2,000 aircraft on JSSI's programs, JSSI is able to harness this expertise and purchase power to support customers across multiple makes and models of both fixed-wing and rotary aircraft. JSSI's 70+ global Technical Support team leads the industry and manages issues through JSSI's network of MRO facilities and is supported by the parts supply company JSSI Parts & Leasing that has thousands of parts in inventory.

Everyday, JSSI's customers rely on the JSSI advantage to stabilize their maintenance costs, get support that adds value to their operations and, ultimately, adds residual value to their assets."

www.jetsupport.com

HELICOPTER OEM OVERVIEW

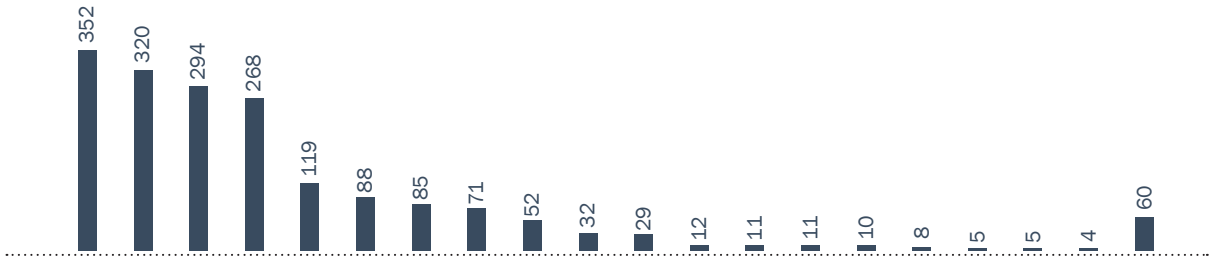
AIRBUS

RANKING **No.1**

GROWTH **+18 1.0%**

MOST POPULAR **H125**

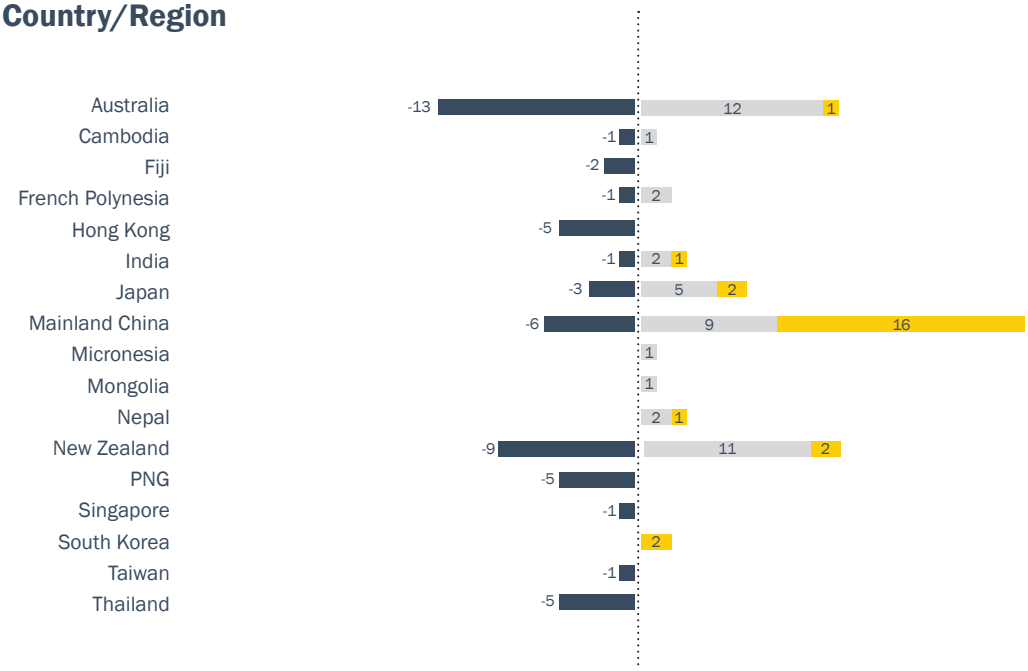
LARGEST FLEET **Japan**



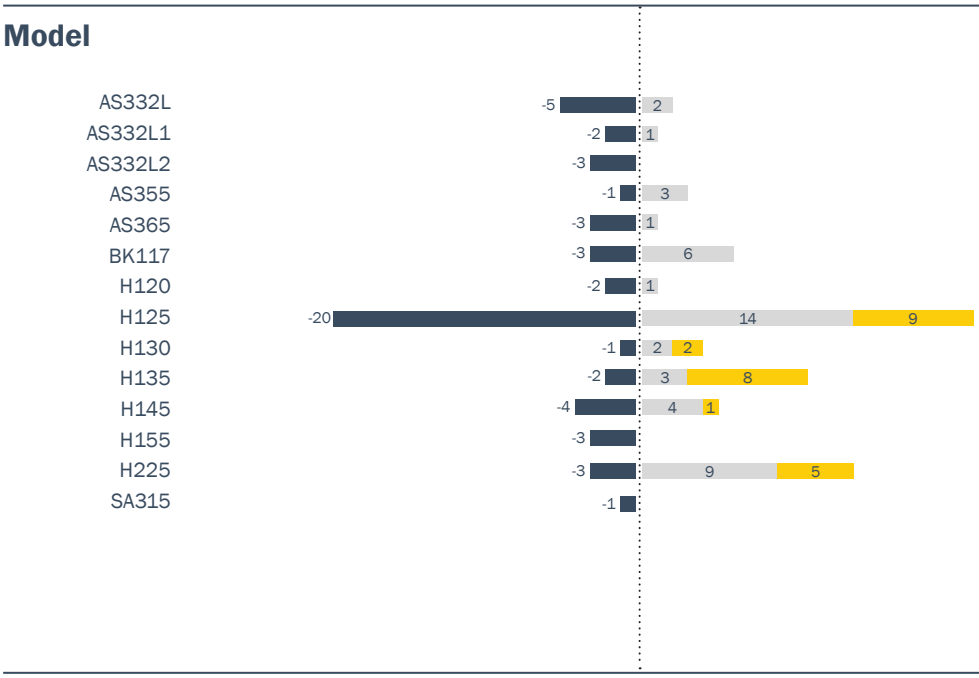
	JAPAN	AUSTRALIA	NEW ZEALAND	MAINLAND CHINA	INDIA	PHILIPPINES	INDONESIA	MALAYSIA	SOUTH KOREA	PNG	THAILAND	CAMBODIA	VIETNAM	HONG KONG	TAIWAN	MYANMAR	LAOS	SRI LANKA	BANGLADESH	OTHERS	TOTAL
AS332C							1														1
AS332L	3		2	2																	7
AS332L1	10			8			2														20
AS332L2	1							3					3								7
AS355	26	20	15		4	7		19	1			1								4	97
AS365	50	12		4	39	4	10	9	12		2	1			8	2				1	154
BK117	29	26	38				4		9	12					2						120
B0105	1	13	6			3	29	8	5	6										3	74
H120	4	24	19	15	2			10						1		1		1			77
H125	86	167	174	131	24	34	17	4	16	9	8	5				5	3	2		44	729
H130	8	32	31	15	6	24	5				3	2						2	4	3	135
H135	79	15	1	33	6	4	4	8	1		3	2		1						3	160
H145	38	7	7	3	5	6	5		1	4	4	1								2	83
H155	5	1		22	1	3	5	5	2		7		4	2			2				59
H175		2									2			7							11
H215				1																	1
H225	12			34				5	5				4								60
SA313						2															2
SA315			1		3		3			1											8
SA316					25																25
SA319					4																4
SA341		1				1															2
Total	**352**	**320**	**294**	**268**	**119**	**88**	**85**	**71**	**52**	**32**	**29**	**12**	**11**	**11**	**10**	**8**	**5**	**5**	**4**	**60**	**1,836**

ADDITIONS AND DEDUCTIONS (AIRBUS)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

PRODUCT SPOTLIGHT:

BELL 505

THE PERFECT FIT FOR ASIA-PACIFIC

Although the 2020 COVID-19 pandemic introduced numerous challenges and uncertainties, operators around the world continued to rely on the Bell 505 to perform and exceed in their current missions, as well as adding new missions into their portfolios. There are currently more than 60 Bell 505s flying in Asia-Pacific.

Although the 2020 COVID-19 pandemic introduced numerous challenges and uncertainties, operators around the world continued to rely on the Bell 505 to perform and exceed in their current missions, as well as adding new missions into their portfolios. There are currently more than 60 Bell 505s flying in Asia-Pacific, flying a variety of different missions including public safety, military training, and emergency management to tourism and corporate transport, utility missions and personal flights.

In China, Reignwood, the largest fleet operator of the Bell 505 as well as a Bell 505 dealer, operates its aircraft in multiple Chinese provinces for Helicopter EMS (HEMS), photography, marketing and tourism, and dry spraying crops. During the COVID-19 pandemic, Reignwood transported medical personnel and equipment across the country, and plans to operate a EMS Lite equipped Bell 505 paired with its HEMS-configured Bell 429 in 2021.

In Shanxi, the Bell 505 has taken on multiple missions. Recently, Reignwood paired up with Shanxi Provincial Fire Rescue Corps to hold the Blue Light – 2021 "Earthquake Rescue Comprehensive Actual Combat Pull Drill and Competition" in Datong City. Two helicopters, including one Bell 505, were involved in the drill along with professional rescuers that were simulating the response to a 6.1 magnitude earthquake.

As the Chinese government is facilitating the growth of helicopter emergency responses, Bell 505s are widely involved in multiple other roles such as firefighting and forest protection. Reignwood showcases its Bell 505s in dozens of drills to prove the helicopters effectiveness as a fire scout to survey the scene and report back on impacted locations. With such a dynamic platform, the Bell 505 is ideal as a first-on-the-scene aircraft and can carry a 2,000-pound Bambi Bucket with 230 gallons of water.

Tourism is also a high-potential market that is supported by the Bell 505 in China. The Bell 505's spacious and open cabin provides top-notch visibility, and the stadium-style rear seats ensure that there are no bad views from the aircraft.

To promote tourism in China, Reignwood has positioned, or leased, aircraft in popular tourist and travel destinations including Beijing, Tianjin, Yunnan, and Sanya. In 2020, Reignwood held a media demo in collaboration with Bell in the heritage city of Datong. During the event, the Bell 505's outstanding performance was showcased after sunset. Showcasing Datong City's light show above the sky not only boosts the light show as an iconic aspect of the city, but also supports the growth of tourism by helicopter.

In other parts of Asia-Pacific, the Bell 505 continues to excel. Currently Japan has the third largest Bell 505 fleet behind the United States and China, with four aircraft operated by the Japan Coast Guard to provide advanced training. The Garmin G1000H NXi avionics suite and dual-channel FADEC provide reduced pilot workload to ensure that pilots at all skill levels can maintain their focus outside the cockpit. Bell 505s are also used in Japan for corporate transport missions and, most recently, prefectural-level police surveillance.

In Australia, 12 Apostles Helicopters uses the Bell 505 for luxury tourism flights. Company Pilot Isobel Stone detailed what she loves about the Bell 505:

> *It is impressive how much power the Bell 505 has. I've never been short of power. People enjoy how big the windows are and how great the visibility and views are.*

"It is impressive how much power the Bell 505 has. I've never been short of power. The passengers really like it too. People enjoy how big the windows are and how great the visibility and views are, especially compared to our light single helicopters. In those bigger helicopters, the windows are so compact that the views are especially bad from the middle seats. In the 505, you have great views from all around."

In Jakarta, Indonesia, Whitesky Aviation relies on two Bell 505s for its Heli City project. Its first Bell 505 flies air taxi and transport missions, whilst its second Bell 505 is used for HEMS missions in Balikpapan. Whitesky Aviation CEO Denon Prawiraatmadja shared with Bell on its use of the Bell 505:

"We have a medical evacuation service contract with a large company there [Balikpapan]. They love to have it because the helicopter has a very capable quick-change capability. We are able to put the stretcher in with a medical assistant sitting behind the pilot to tend to the patient. It is very good as a standby helicopter in case they need medical support, because the company is six hours from the hospital by car or ambulance. When they did not have the capacity to pay the extra cost for a larger helicopter, we were able to offer the 505 at a lower cost and meet the mission."

To adapt to the challenging times and continue to connect with customers, the Bell team hosted and attended virtual events throughout 2020. At Bell headquarters, Bell hosted two virtual events. The first one was a "Live with the Bell 505" virtual tour that highlighted the platform and included discussions with Bell sales and pilot team members. Bell's next event, the Bell Live Showcase, included an overview of Bell's full commercial portfolio and customer support and services network. Key Segment Specialist at Bell and former Aviation Commander at Arizona's Department of Public Safety, Terry Miyauchi, walked through the Bell 505 public safety-configured demonstrator to highlight its many benefits.

In Japan, the Bell team attended Inter BEE for the first time for the event's first virtual event. This event is dedicated to the media, entertainment and broadcasting industries. At this event, Bell shared its product line and emphasized the Bell 505 as a cost-effective and modern platform for Electronic News Gathering (ENG) missions.

Finally, in the Philippines, Bell teamed up with Tatler Philippines for a virtual event titled "Come Fly With Me" for select Tatler guests to discuss the future of travel and the possibilities that come along with using helicopters for private transport and charter.

Around the world, the Bell 505 is carrying teams through challenging tasks and thrilling flights while attracting interest from more potential customers. As more operators continue to harness the power of this aircraft, its mission capabilities grow with every new customer and every opportunity to demonstrate its mastery of flight.

www.bellflight.com

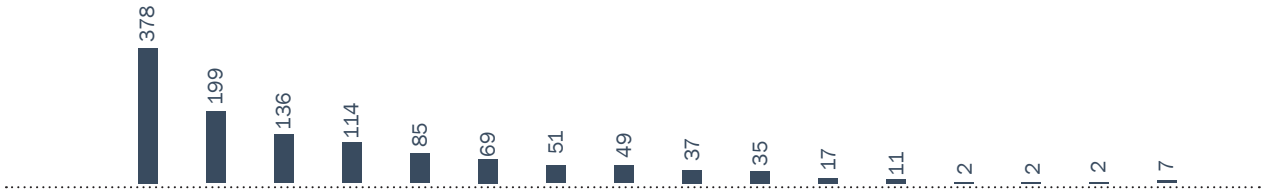
BELL

RANKING **No.2**

GROWTH **39 ▲ 3.4% ▲**

MOST POPULAR **Bell 206**

LARGEST FLEET **Australia**

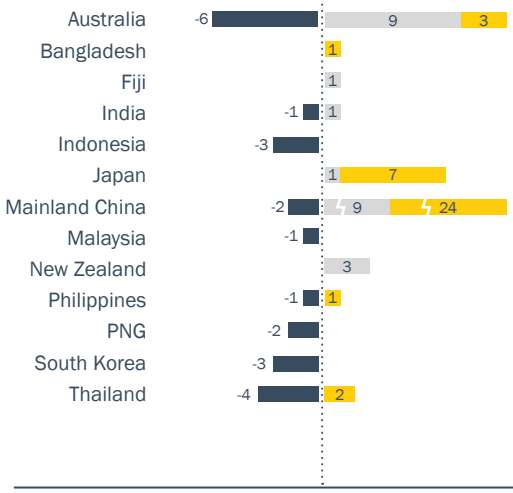


	AUSTRALIA	MAINLAND CHINA	JAPAN	NEW ZEALAND	INDIA	INDONESIA	THAILAND	PNG	SOUTH KOREA	PHILIPPINES	MALAYSIA	BANGLADESH	VIETNAM	CAMBODIA	TAIWAN	OTHERS	TOTAL
Bell 204	5		7	1													13
Bell 205	19		1	7			4		1								32
Bell 206	254	42	26	91	18	17	8	8	19	17	12				2	2	516
Bell 209	2																2
Bell 212	15	2			1	4	8	15								2	47
Bell 214	10							2	5								17
Bell 214ST	1								1								2
Bell 222	5			1				1			1						8
Bell 230					2				1			1				3	4
Bell 407	9	115	7		25	12	3	19	2	4	2	6					207
Bell 412	38	4	51		26	23	18	3	6	1							170
Bell 427	5	1	6	2	2	2				1							19
Bell 429	5	17	6	7	9	10	10			6	1	2					73
Bell 430			12		1	1		1	2	2		2					21
Bell 505	10	18	20	5	1					4	1		2	2			63
Total	**378**	**199**	**136**	**114**	**85**	**69**	**51**	**49**	**37**	**35**	**17**	**11**	**2**	**2**	**2**	**7**	**1,194**

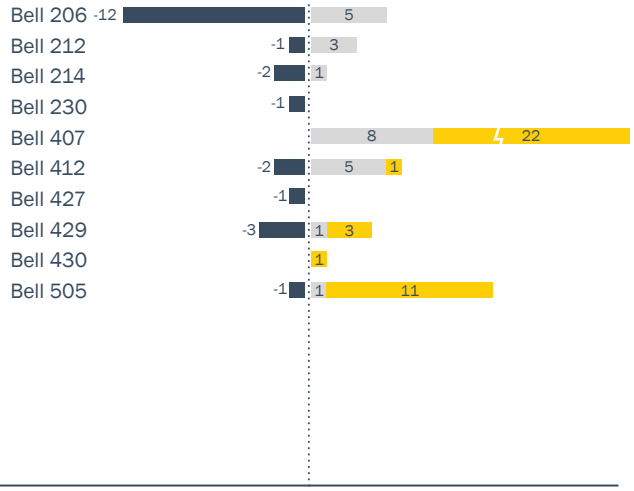
ADDITIONS AND DEDUCTIONS

New Deliveries (+38) | Pre-owned (+24) | Deductions (-23)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

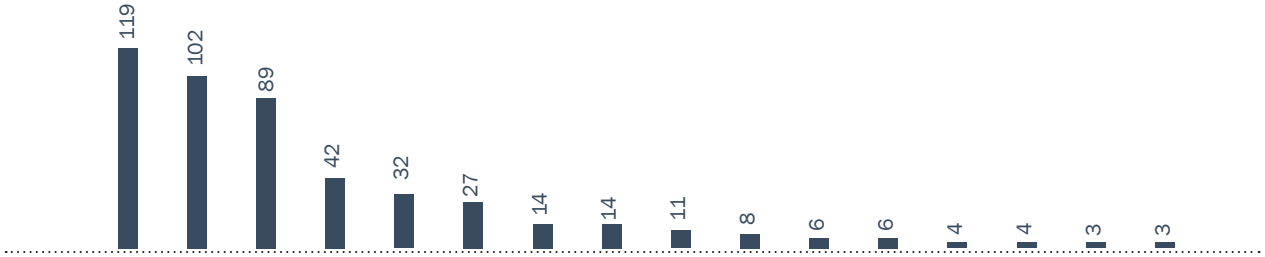
LEONARDO

RANKING **No.3**

GROWTH **6 ▲ 1.3% ▲**

MOST POPULAR **AW139**

LARGEST FLEET **Japan**

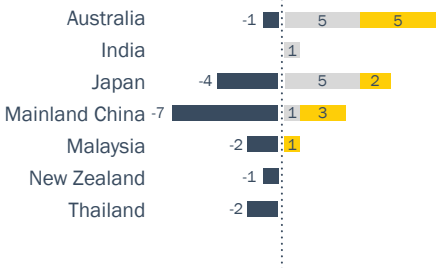


	JAPAN	MAINLAND CHINA	AUSTRALIA	INDIA	MALAYSIA	SOUTH KOREA	PHILIPPINES	INDONESIA	NEW ZEALAND	THAILAND	MYANMAR	MACAU	BANGLADESH	VIETNAM	TAIWAN	OTHERS	TOTAL
AH.1									2								2
AW109	53	28	21	24	3	7	4	2	3				1			1	147
AW119	1	38	3	4	1	1	3	2	1				3				57
AW139	60	30	62	12	22	12	6	7	3	8	6	6				2	236
AW169	4	1	1	2		5	1	3	2						3		22
AW189	1		2		6	1								3			13
SW-4		5				1											6
Total	**119**	**102**	**89**	**42**	**32**	**27**	**14**	**14**	**11**	**8**	**6**	**6**	**4**	**3**	**3**	**3**	**483**

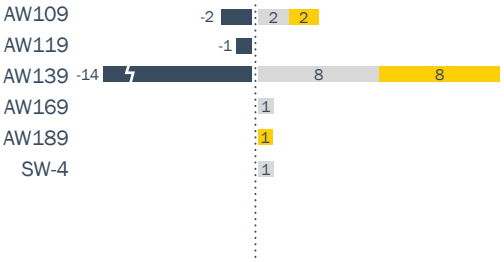
ADDITIONS AND DEDUCTIONS

New Deliveries (+11) | Pre-owned (+12) | Deductions (-17)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

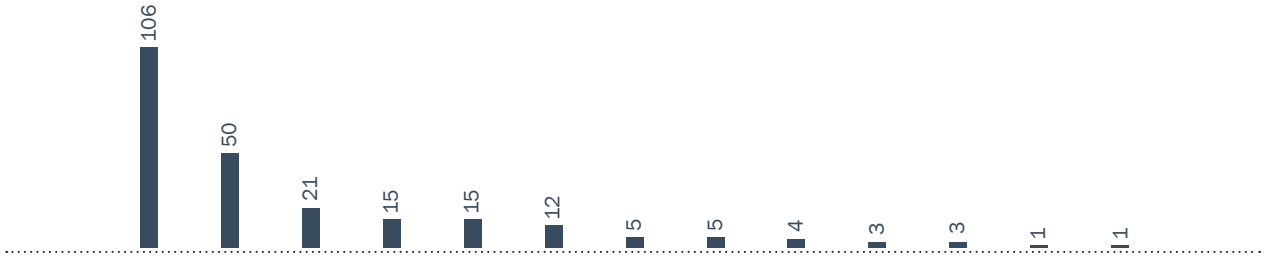
MD

RANKING **No.4**

GROWTH **+2 ▲ 0.8% ▲**

MOST POPULAR **MD 500**

LARGEST FLEET **New Zealand**



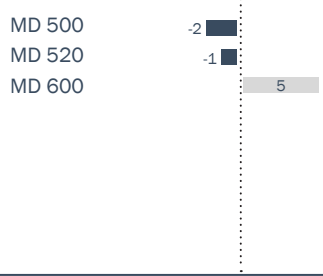
	NEW ZEALAND	VANUATU	AUSTRALIA	GUAM	JAPAN	PHILIPPINES	SOUTH KOREA	HONG KONG	INDONESIA	MAINLAND CHINA	INDIA	MALAYSIA	NEW CALEDONIA	TOTAL
MD 500	74	50	15	15	3	7	4	1	4				1	174
MD 520	21		4				1	1		1	1			29
MD 530	4		1											5
MD 600	5		1		1	2				1		1		11
MD 900	2				11	3		3		1	2			22
Total	**106**	**50**	**21**	**15**	**15**	**12**	**5**	**5**	**4**	**3**	**3**	**1**	**1**	**241**

ADDITIONS AND DEDUCTIONS

New Deliveries (-) | Pre-owned (+5) | Deductions (-3)

Country/Region

Model



Note: Excludes movements between countries/regions in APAC.

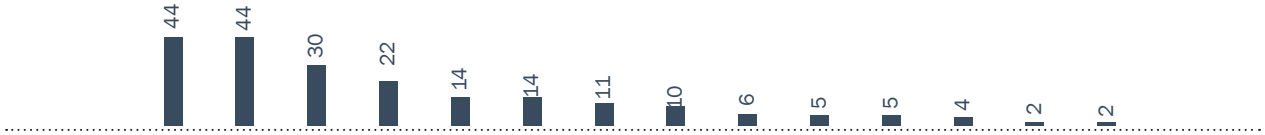
SIKORSKY

RANKING **No.5**

GROWTH **-3 -1.4%**

MOST POPULAR **S-76C++**

LARGEST FLEET **Mainland China & South Korea**

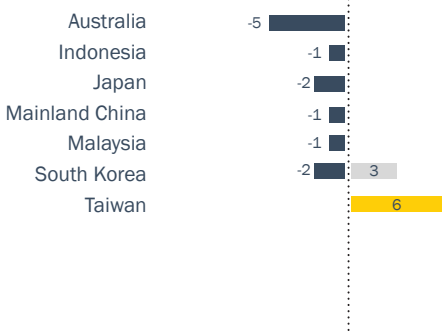


	MAINLAND CHINA	SOUTH KOREA	JAPAN	AUSTRALIA	TAIWAN	INDONESIA	THAILAND	MALAYSIA	INDIA	MYANMAR	NEW ZEALAND	BRUNEI	PAPUA NEW GUINEA	PHILIPPINES	TOTAL
S-330				1					1					1	3
S-333	1		1												2
S-58		3													3
S-61		7				1									8
S-64		6													6
S-70A												1			1
S-76A		2	1	1		1					3		1	1	10
S-76A+		1	1	4											6
S-76A++		5													5
S-76B		5	1	2				1							9
S-76C		1	3					4		1					9
S-76C+	6	7	4	1		2	3	1							24
S-76C++	16	2	4			10	1	4	5	4	2		1		49
S-76D	8	3	15				5								31
S-92	13	2		13			2					3			33
UH-60					14										14
Total	**44**	**44**	**30**	**22**	**14**	**14**	**11**	**10**	**6**	**5**	**5**	**4**	**2**	**2**	**213**

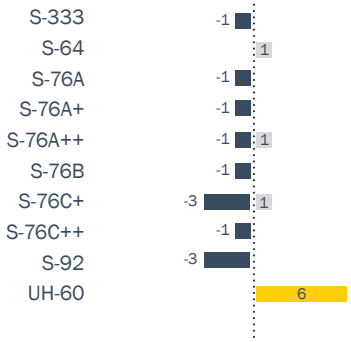
ADDITIONS AND DEDUCTIONS

New Deliveries (+6) | Pre-owned (+3) | Deductions (-12)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

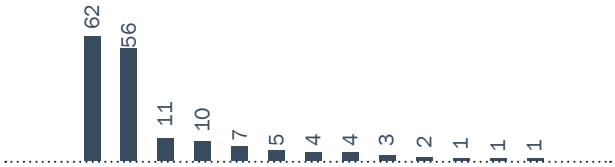
RUSSIAN HELICOPTERS

RANKING **No.6**

MOST POPULAR **KA-32**

GROWTH **7 ▲ 4.4% ▲**

LARGEST FLEET **South Korea**



	SOUTH KOREA	MAINLAND CHINA	VIETNAM	INDONESIA	INDIA	PNG	MONGOLIA	NEPAL	SRI LANKA	THAILAND	NEW ZEALAND	LAOS	JAPAN	TOTAL
KA-32	49	21		2						2			1	75
Mi-17			2											2
Mi-171		28	3											31
Mi-2	10			6										16
Mi-26		4												4
Mi-34											1			1
Mi-8	3	3	6	2	7	5	4	4	3			1		38
Total	**62**	**56**	**11**	**10**	**7**	**5**	**4**	**4**	**3**	**2**	**1**	**1**	**1**	**167**

ROBINSON

RANKING **No.7**

MOST POPULAR **R66**

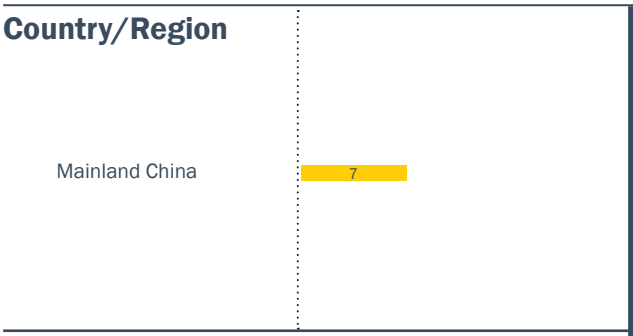
GROWTH **6 ▲ 5.7% ▲**

LARGEST FLEET **Australia**

	AUSTRALIA	MAINLAND CHINA	JAPAN	BANGLADESH	NEW ZEALAND	MALAYSIA	PHILIPPINES	INDIA	INDONESIA	HONG KONG	SRI LANKA	THAILAND	OTHERS	TOTAL
R66	32	23	17	13	5	5	4	3	3	2	1	1	3	112
Total	**32**	**23**	**17**	**13**	**5**	**5**	**4**	**3**	**3**	**2**	**1**	**1**	**3**	**112**

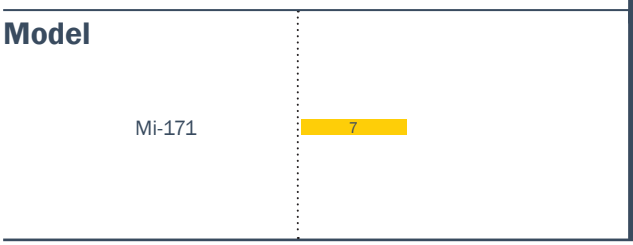
ADDITIONS AND DEDUCTIONS

Country/Region

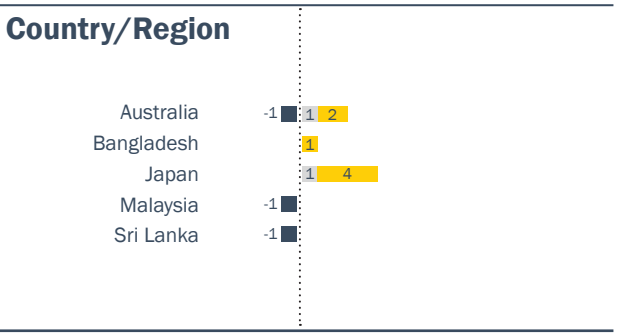


New Deliveries (+7) Pre-owned (-) Deductions (-)

Model

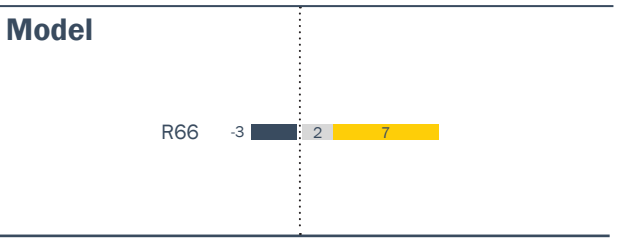


Country/Region



New Deliveries (+7) Pre-owned (+2) Deductions (-3)

Model



Note: Excludes movements between countries/regions in APAC.

PRODUCT SPOTLIGHT:
RUSSIAN HELICOPTERS KAMOV KA-32A11M

The all-weather multipurpose civil Ka-32 with coaxial rotors and an MTOW of 11 tons, was developed by the Kamov Design Bureau of "Russian Helicopters" JSC. It has Russian and EASA Type certificates. Currently, over 240 Ka-32s have been built, which are in operation in more than 30 countries all over the world. The coaxial rotors give the helicopter a range of important stabilization and maneuverability advantages, which is especially important for firefighting missions. There are more than 100 configuration options for the Ka-32 series.

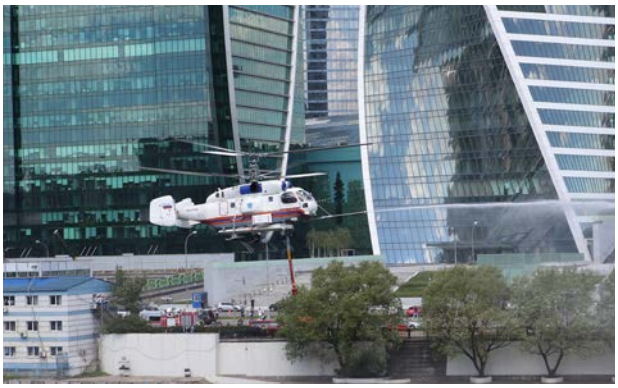
RUSSIAN HELICOPTERS

The Ka-32A11M is part of the Ka-32 helicopter family and is an upgraded version of the Ka-32A11BC.

The all-weather multipurpose civil Ka-32 with coaxial rotors and an MTOW of 11 tons, was developed by the Kamov Design Bureau of "Russian Helicopters" JSC. It has Russian and EASA Type certificates. Currently, over 240 Ka-32s have been built, which are in operation in more than 30 countries all over the world. The coaxial rotors give the helicopter a range of important stabilization and maneuverability advantages, which is especially important for firefighting missions. There are more than 100 configuration options for the Ka-32 series.

OPERATION BACKGROUND

- Leading batch of Ka-32s has accumulated 24,000 hours per helicopter in Canada
- Average utilization rate for a Ka-32 is 270 hours per month, per helicopter
- Up to 16 hours operation per helicopter, per day, with hot refueling and one stop for crew change
- Up to 60 lift cycles (heli-logging) per hour, per helicopter
- Up to 30 lift cycles (fire-fighting with Bambi Bucket) per hour, per helicopter



- 32,000-hour airframe approved service life
- 10-year/8,000hour heavy maintenance works interval

MODERNIZATION

The upgraded Ka-32A11M is an upgrade of the Ka-32A11BC helicopter. The upgrade program includes:

- Max. load-carrying capacity on external sling increased to 5,300 kg
- Increased flight safety at 2.5-min OEI rating (2400 hp - 2700 hp)
- Substitution of imported components. Glass "cockpit" adapted to the use of NVG
- New fire-fighting system SP-32 with expanded tank capacity to 4,000 liters. Compared to its overseas competitors, the new Russian made SP-32 water tank has a more attractive price and can carry up to four tons of water. It also has digital controls and upgraded water intake and discharge ergonomics. In addition, it can be operated at sub-zero temperatures.

FIRE-FIGHTING EQUIPMENT

The Ka-32A11BC is recognized by experts as one of the finest firefighting helicopters in the world and is a symbol of the Global Helicopter Firefighting Initiative, a program aimed at increasing the efficiency of specialized firefighting helicopters kitted out with suspended fire-fighting systems, water cannons and other fire-fighting equipment.

Bucket system

- Russian system - VSU-5A with 5000 l capacity
- Overseas system - «BAMBI BUCKET» HL5000 5000 l capacity
- Water tank system
- Russian system - SP-32 with 4000 l capacity
- Overseas system - Simplex 328 with 3000 l capacity
- Water cannon for horizontal firefighting in hovering mode (compatible with both Simplex-328 and SP-32)

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PERFORMANCE

MAX SPEED	260 KM/H
CRUISE SPEED (MAX CONTINUOUS ENGINE RATING)	2 KM/H
SERVICE CEILING	5000 M
MAX RANGE (STANDARD FUEL)	650 KM
CREW	1-3 PPL
PASSENGERS	UP TO 13 PPL

ENGINES

2 X TV3-117VMA	
TAKEOFF POWER	2 X 2,200 HP
2.5-MIN OEI POWER	2 X 2,400 HP

TRANSPORT CABIN DIMENSIONS

LENGTH	4520 MM
WIDTH (MAX AT FLOOR LEVEL)	1450 MM
HEIGHT	1320 MM
VOLUME	7.3 M^3

WEIGHTS

MAX TAKEOFF WEIGHT	11000 KG
MAX TAKEOFF WEIGHT WITH UNDERSLUNG LOAD	12700 KG
MAX. PAYLOAD	
- INSIDE TRANSPORT CABIN	3700 KG
- ON EXTERNAL SLING	5300 KG

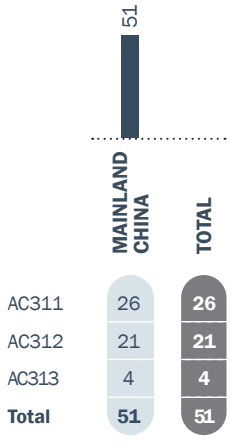
AVICOPTER

RANKING
No.8

MOST POPULAR
AC311

GROWTH
3 ▲ 6.3% ▲

LARGEST FLEET
Mainland China



	MAINLAND CHINA	TOTAL
AC311	26	26
AC312	21	21
AC313	4	4
Total	**51**	**51**

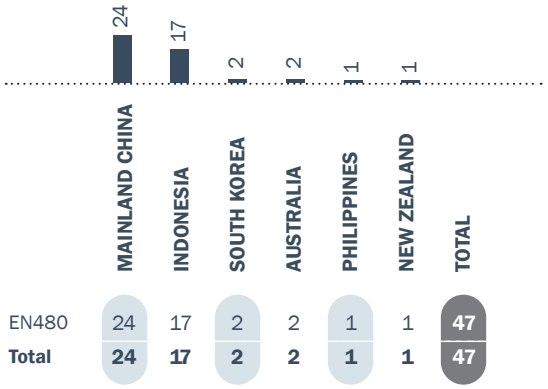
ENSTROM

RANKING
No.9

MOST POPULAR
EN480

GROWTH
-1 ▼ -2.1% ▼

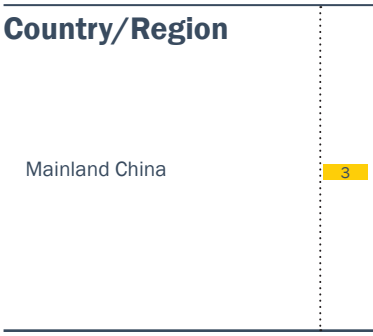
LARGEST FLEET
Mainland China



	MAINLAND CHINA	INDONESIA	SOUTH KOREA	AUSTRALIA	PHILIPPINES	NEW ZEALAND	TOTAL
EN480	24	17	2	2	1	1	47
Total	**24**	**17**	**2**	**2**	**1**	**1**	**47**

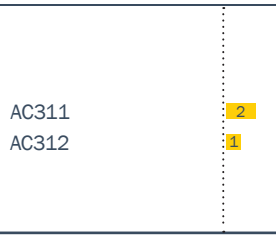
ADDITIONS AND DEDUCTIONS

Country/Region



New Deliveries (+3) Pre-owned (-) Deductions (-)

Model



Country/Region

New Deliveries (-) Pre-owned (+1) Deductions (-2)

Model

Note: Excludes movements between countries/regions in APAC.

SPECIAL FEATURE:

UAM AND EVTOLS

INTERVIEWS:
EHANG | BLADE | ASCENT

INTERVIEW : EHANG

EHANG 亿航
EH | Nasdaq Listed

As a key player in Urban Air Mobilty (UAM) Guangzhou China-based EHang was the first company to announce that it had been working on an Autonomous Aerial Vehicle (AAV). The company did this in spectacular style in January 2016 when it unveiled its EHang 184 AAV at the influential Consumer Electronics Show (CES) in the US. As with many new programs working with new technologies, the EHang 184 served as a proof of concept for the company, and many of the lessons learnt made their way onto the EHang 216, which the company is hoping to bring to mass market soon.

Now, the company is working on the certifications that it needs to bring its Urban Air Mobility vision to life. Trial flights have been conducted in 42 cities across 8 countries, and EHang will continue to expand its footprint. Asian Sky Media caught up with EHang and asked about its vision of the future, government attitudes towards the rise of AAVs and eVTOLs, and when it believes that UAM will become widely adopted.

What role will eVTOLs play in UAM?

We believe that in the future, Urban Air Mobility (UAM) should cover two major parts: inter-city and intra-city.

We think eVTOLs are more suitable for inter-city travel, given their longer range and higher speeds. However, they may not fit for intra-city travel, which requires vehicles with smaller size and higher maneuverability. Thus, we believe our EH216 AAVs are more suitable for intra-city travel over highly populated areas as they can land easier on high-rise buildings. We expect a full UAM network to consist of both AAVs and eVTOLs, which will connect intra-city traffic seamlessly with inter-city traffic.

Moreover, we believe a centralized command-and-control platform is the key for UAM operations to ensure absolute safety, especially in urban areas with heavy traffic and dense populations. In our view, fixed point-to-point routes need to be predetermined, tested and monitored for UAM uses.

As global UAM leader, EHang is willing to cooperate with partners in designing and constructing a full eco-system for the implementation of UAM.

Which helicopter operations/missions are more, or less, likely to be replaced by eVTOLs in the near future?

We believe eVTOLs should possess the following key advantages over conventional helicopters: higher safety level guaranteed by power redundancy and full back-up systems; autonomous flight to save cost and further enhance safety and accuracy; lower noise levels; smaller size with higher maneuverability for urban use; and electrically powered with zero emissions.

Therefore, almost all aerial functions performed by helicopters could be replaced by eVTOLs. Currently, the only bottleneck we see for eVTOLs is limited range vs. helicopters. However, we believe further progress in battery technologies will ultimately solve this issue so that eVTOLs can completely replace helicopters in future.

What are the attitudes of different government bodies on eVTOLs?

Based on our extensive interactions with various government bodies, we have seen enthusiasm and supportive attitudes in general.

Take China for example, the General Office of the State Council of the PRC issued a circular in November 2020 proposing to accelerate the strategic development of Urban Air Mobility (UAM) in China. The circular aims to bring the

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development of UAM into China's National Strategies and to formulate the relevant policies and standards to promote the healthy development of the industry. Such policies and standards, once made, are expected to lay a solid regulatory foundation that should pave the way for China to become the world's largest UAM market.

Recently, bills introduced into both houses of the U.S. Congress would instruct the federal government to convene an interagency working group to study advanced air mobility (AAM) and coordinate a national strategy in support of new aviation technologies.

In 2020, both South Korea and Japan announced their plans to elevate UAM to national strategic status.

Which regions have the greatest potential for eVTOL growth?

We think potential market demand should be driven by several factors - urban population, affordability, and income levels. Metropolitan areas with high population density such as Hong Kong, London, New York, Shanghai, Tokyo, Singapore etc. are good potential markets given their high population density and high income levels. Moreover, residents on islands and mountains are also good potential users of eVTOLs.

According to research released by the United Nations in 2018, by 2050, 68% of the world's population will reside in urban areas, up from 55% as of today.

Does EHang have any preliminary plans or projections on the implementation phase/timeline of UAM?

With extensive real flights taken in 42 cities and 8 countries by EHang in the past 3-4 years, we believe UAM will become a reality in the near future.

With the support from regulators and governments around the world, EHang will continue to accelerate regular operations of its intelligent AAV technologies for aerial logistics and provide customized solutions for clients from various sectors including logistics, retail, e-commerce and offshore oil and gas by helping them improve efficiency at lower costs.

BLADE

Blade first launched its services in India during November 2019 with a joint venture that it had formed between itself and locally based investment company Hunch Ventures. For Blade, India, with its huge population and crowded cities, was an obvious choice for its international expansion. According to the company's analysis, major Indian cities are frequently ranked as some of the most congested cities in the world, costing the country an estimated $22 billion per year. By introducing its helicopter services, the company is seeking to solve part of the urban mobility issue, but it is also planning for the future when Electric Vertical Aircraft ("EVA"), also known in the aerospace community as eVTOLs, become widely available. That, thanks to lower operating costs making flights more affordable says the company, would mean that India has a potential market of 50 million passengers.

But for now, the company is concentrating on building up its presence in the Indian market by building infrastructure and forming partnerships with local operators. As an asset light company Blade does not own helicopters itself, it charters them from other operators. So far, Blade India has formed partnerships with five operators, giving it access to a fleet of more than helicopters. That number is growing, especially as the company is currently in discussions with 14 State Governments on adding them to Blade's network.

With one eye on the present, and one on the future, Asian Sky Media asked Blade's Director of Corporate Development and Legal, Stephen Cugliari three questions about the challenges the company faces, and how it is preparing for the future.

BLADE AND URBAN MOBILITY IN ASIA-PACIFIC

STEPHEN CUGLIARI
DIRECTOR, CORPORATE DEVELOPMENT AND LEGAL

What were / are the challenges you face short term / long term & domestically & internationally?

Both domestically and internationally, the main challenge is consumer acceptance. In the short-term, it is consumers accepting helicopters as a method of transportation on routes traditionally traveled by ground. In the long-term, it is consumer acceptance and trust of EVA. It has taken a few years to convince people to regularly use helicopters, and we expect that it will also take time for consumers to fully adopt EVA. However, we think one of our greatest advantages comes from offering our services to consumers now and building their trust. We have successfully grown our flier base since inception, and we believe the trust we have earned will help us continue doing the same with EVA.

How is Blade preparing for the EVAs of the future?

We are taking a number of steps to prepare for the transition to EVA.

Firstly, we are focused on continuing to grow our brand and customer base using existing rotorcraft. As part of this, we have begun expanding our short-distance routes and, on select routes, offering commuter passes, which unlock rates as low as $95 per seat. The more fliers we have today who trust our brand and product, the easier it will be to transition to EVA at scale.

In addition, we have been building our strategic passenger terminal infrastructure. Blade operates exclusive passenger terminal infrastructure in key markets, positioning us for competitive advantage in locations that are constrained by geography, or regulation, from adding new heliports.

Finally, we are continuing to grow our MediMobility business. Blade is the largest transporter of human organs in the Northeast United States, which reduces the costs and transport time for hospitals versus legacy competitors. Given that organ movements are expected to be one of the first uses of EVA before passenger flights, we see this as a critical part of our growth strategy.

What are Blade's objectives, and how do you achieve them?

Between today and the first passenger EVA flights, we will continue to launch new routes with the aim of saving our fliers' time. We are constantly analyzing new markets throughout the world to understand the traffic patterns and sources of friction. Without logical routes that provide sufficient value to fliers, our flier base will not grow. We will also continue expanding our strategic passenger terminal infrastructure. Beyond providing an enjoyable and seamless pre-boarding experience, operating our own network of terminals allows us to streamline the departure and arrival process to improve the flier experience and increase our aircraft utilization rates.

Our proprietary "customer-to-cockpit" technology stack enables us to manage hundreds of fliers across numerous simultaneous flights, coordinating multiple operators flying between terminals across our route network. We believe that this technology, which provides us with enhanced logistics capabilities and information from our fliers signaling their interest in new routes, will enable us to continue to scale our business, especially with EVA.

We believe each of these are key to a successful urban air mobility service, whether utilizing EVA or traditional rotorcraft, and, together, will accelerate Blade's transition to EVA.

www.blade.com

ASCENT: DEMOCRATIZING ACCESS TO AIR MOBILITY

Words by Alud Davies

Whilst working as a senior advisor for an investment company in 2017, Lionel Sinai-Sinelnikoff became acutely aware the industry was at a crossroads. On one hand it was seen as modern and dynamic, but on the other hand it was still very old fashioned. It was around that time that the sharing economy was booming, Uber had become a household name, and new sites like AirBnB were beginning to gain popularity. And whilst several services had begun to spring up offering flight sharing on helicopters and private jets, the concept was yet to take off.

Before joining the investment, company Lionel had worked at Airbus Helicopters for 14 years, where he worked alongside operators in Latin America and Asia to help develop and open up new markets. This gave him an inside understanding of the problems and issues faced in the region, especially in urban mobility. Lionel gives the example of the world's second most congested city Manila - a sprawling city with a huge population and the traffic gridlock to go along with it. It was Manila that Ascent chose to start its operations in, not only due to its famous congestion, but also because the Philippines regulators were known to be forward thinking.

Ascent's goal was to get people moving differently, democratizing access to air mobility. To do this, it needed the buy in from various stakeholders. This included the helicopter operators, helipad owners, as well as the local regulators. With strategic partners in hand, Ascent launched operations in 2019, testing the market with a shuttle type concept between different locations. The company soon pivoted more towards on-demand rideshare and charter flights, which is where the company is today.

For the end user, the passenger flying, booking a trip with Ascent is as seamless as it can be. From the Ascent.flights online platform, passengers chose where they want to go, and any ancillary options that they might need. This can include a complete door-to-door service, where a car picks up the passenger from their departure point and takes them to the helicopter, as well as a car the other end to take them to their final destination. For the user, this process seems easy and straight forward, but in the background, a lot of work is being done to bring everything together. "We bring together all the different stakeholders from the demand side, on the supply side and as well as the regulator. And then we run and we orchestrate the journey." Says Lionel.

Although Ascent uses helicopters now, Lionel says that this is just a steppingstone until eVTOLs become available. As he himself says, its better to do the groundwork now and have the technology in place ready for when they become available. "We started with helicopters today because they exist with compatible regulation in place, and it helps us to learn and set everything up for when the eVTOLs come into play. We know it's not a zero to one game, so you need to prepare step by step." Says Lionel.

That preparation has seen the company add Bangkok to its list of operational cities, with more to come. The company is actively working on two additional cities that should become operational soon, with Lionel saying that the company has built up its capabilities in those cities and will be ready to begin services soon after they get the go ahead to do so.

It is likely that those cities are, for the time being at least, still in Asia, but Ascent isn't only focused on the Asia-Pacific region, it has its sights set firmly on global expansion.

"We are building a scalable and sustainable company. While our vision is large, our ambitions are high, we are moving pragmatically. We do have several other projects running, we have partners in some other countries, and we are crafting step by step what the approach should be. We have now the ability to trigger, even if we are very remote, and we might start with in some countries with a different model in the beginning, just to try to be more compatible with the needs of the country." Says Lionel.

To orchestrate ecosystems, deliver seamless air mobility journeys and help make market decisions, the company has built up its proprietary technology to help collect and analyze huge chunks of data, including behavioral data on helicopter flights, air operations, mobility requirements within and around urban environments. This helps the company understand where demand is coming from, where and how Ascent is likely to be successful. This is just one stage of the analysis though, as other factors can become more important – including regulatory challenges.

For now, the company is looking for partners to help it expand, with Lionel's short-term focus being on the creation of what he calls 'Absolute Travel Bubbles' which would see the company having the capability of being able to transport people safely from one place to another, up to across international borders. To do this, Ascent would need the buy in of various stakeholders, including airlines. "We can collaborate with other stakeholders such as airlines, and private jet companies to create Absolute Travel Bubbles from door-to-door, mostly by air."

For the foreseeable future, that is likely to rely heavily on helicopters, as Lionel thinks it is most likely that we will see eVTOLs flying within the next few years in strictly limited conditions, as part of the learning process and due to the current constraints with batteries, regulatory challenges linked to traffic and safety, and business viability. "We look forward to welcoming eVTOLs as soon as they are ready and are happy to help capture what is needed from a market perspective based on data, experience and activities." Says Lionel.

www.ascent.flights

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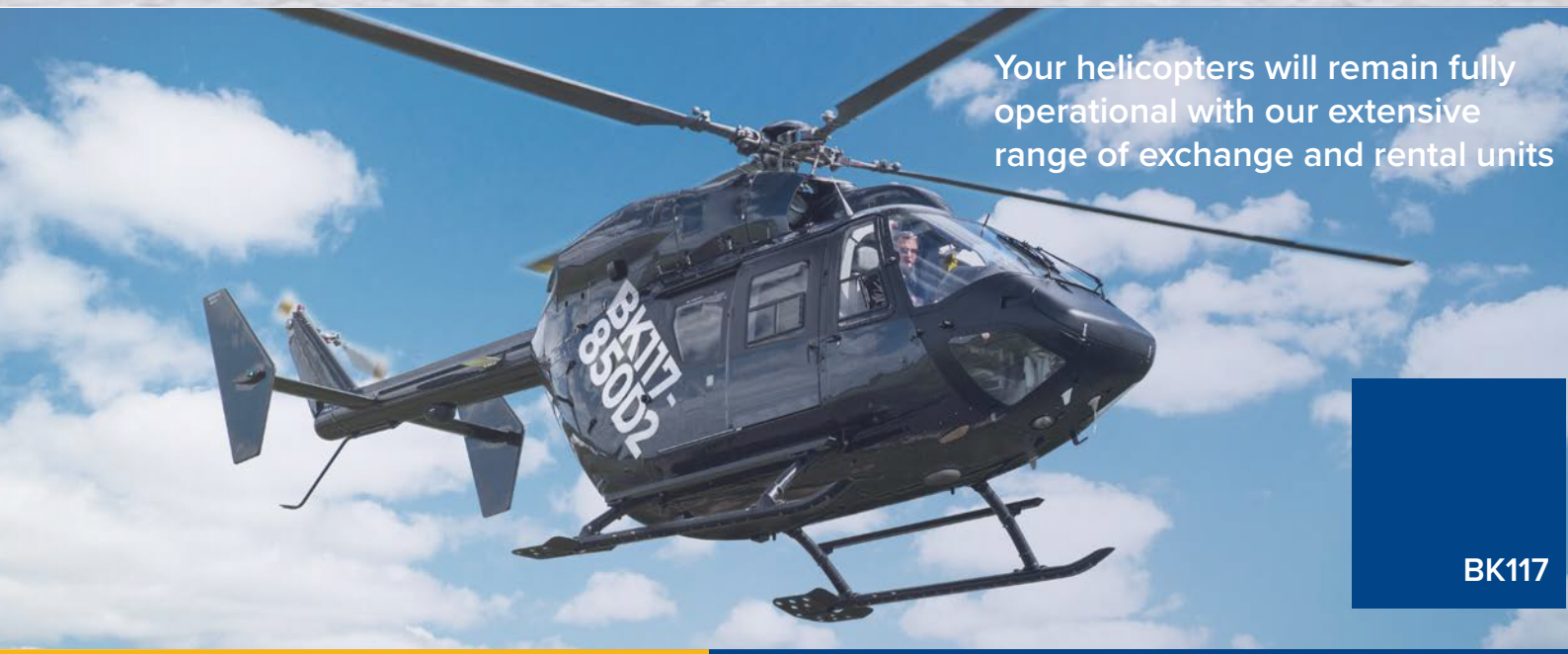

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APPENDIX

REGION BREAKDOWN

EAST ASIA

Japan
South Korea
Mongolia

GREATER CHINA

Mainland China
Hong Kong
Macau
Taiwan

OCEANIA

Australia
Fiji
French Polynesia
Guam
New Caledonia
New Zealand
Palau
Papua New Guinea
Solomon Islands
Vanuatu

SOUTHEAST ASIA

Brunei
Cambodia
Indonesia
Laos
Malaysia
Myanmar
Philippines
Singapore
Thailand
Vietnam

SOUTH ASIA

Bangladesh
Bhutan
India
Maldives
Nepal
Sri Lanka

CONFIGURATION CATEGORIES

The largest configuration category is broadly defined as Utility. Most helicopters in this category are active in more than one mission and can perform various tasks:

- Onshore Oil & Gas and Mining (distinct from offshore)
- Cargo Lifting
- Forestry (surveying, logging and protection)
- Firefighting
- Aerial Photography
- Aerial Tours
- Agriculture and Pest Control
- Powerline Repair and Survey
- Media Industry

SIZE CATEGORIES

SINGLE

H120
H125
H130
SA313
SA315
SA316
SA319
SA341
AC311
Bell 204
Bell 205
Bell 206
Bell 407
Bell 505
Bell AH-1
EN480
AH.1
AW119
SW-4
MD 500
MD 520
MD 530
MD 600
R66
Mi-34
S-330
S-333
S-58
FH-1100
JETEXEC 162
K-Max

LIGHT TWIN

AS355
BK117
BO105
H135
H145
Bell 222
Bell 230
Bell 427
Bell 429
AW109
MD 900

MEDIUM

AS365
H155
AC312
Bell 212
Bell 214
Bell 214ST
Bell 412
Bell 430
AW139
AW169
KA-32
Mi-2
S-70A
S-76A
S-76A+
S-76A++
S-76B
S-76C
S-76C+
S-76C++
S-76D
UH-60
Dhruv
Surion

SUPER MEDIUM

H175
AW189
Bell 525

HEAVY

AS332C
AS332L
AS332L1
AS332L2
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Mi-8
S-61
S-64
S-92
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DISCLAIMER

CONTRIBUTION

ASG would like to acknowledge the gracious contributions made by numerous organization, including aircraft operators, OEMs, leasing companies and aviation authorities in providing data for this report.

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