ASIAN SKY

Fleet Report

ASIA-PACIFIC REGION
CIVIL HELICOPTERS

YE 2021

MARKET UPDATES
LEASING
OFFSHORE
EMS

INTERVIEWS AND INSIGHTS

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EDITOR'S NOTE

If you were one of the thousands of readers of last year's Asia-Pacific Helicopter Fleet Report, you'll know that we voiced some concerns surrounding the mainland China market, how many of the helicopters delivered into the country were in service as well as the viability of the EMS sector.

Unfortunately, during 2021 some of those questions were answered when Shanghai Kingwing, mainland China's biggest EMS operator, announced its bankruptcy. Kingwing's 68 EMS configured helicopters immediately taken out of service, decimating the country's EMS fleet. Worse still was the impact that it had on mainland China's overall fleet – having grown by 54 aircraft in 2020, the fleet contracted by six helicopters in 2021. Of course, it was not just mainland China that saw losses, the helicopter fleets in India and Malaysia also declined. Despite this, across the whole Asia-Pacific region the civil turbine helicopter fleet grew by 1.4% in 2021.

Although the 1.4% growth is lower than the 1.9% of the previous year, that the fleet continued to grow demonstrates the resilience of the industry. It also demonstrates the adaptability of the industry as well. When people outside of the industry think about helicopters, they invariably think of VIP machines whisking the well-heeled from their MegaYachts to their mansions in the countryside. But in the past few years this has been changing and it's all thanks to the AAM / UAM revolution.

It is hard to pick up any publication these days and not be confronted by an AAM / UAM story. It seems like there is a new eVTOL (electric takeoff and landing) launched every day, and every other day we hear about another eye wateringly large sum of money being poured into the industry. What was once the realm of smaller companies lead by enthusiasts is now dominated by big multi-national companies with deep pockets and even bigger expectations.

In the near term this can only be a good thing for the Helicopter industry. The AAM / UAM industry is moving at such a pace that it hasn't waited for the e in eVTOL. Across the region Ascent and Blade are already laying the groundwork for the revolution by using traditional helicopters. Both have an eye on the future, and both are actively making plans for when eVTOLs arrive. Both also appear in our sister publication – the Asia-Pacific UAM report, which was released for the first time this week.

In the 2021 edition of the Asia-Pacific Civil Helicopter Fleet Report you will find all of the usual hard data and intel that you have come to rely on.

Special features in this edition include Interviews with LCI – which talks us through how resilient the industry has been across the region, and Bristow – which talks about the future opportunities it sees in the AAM / UAM market.

Elsewhere Safran explains all of its service offerings and locations in Asia-Pacific, whilst last but very definitely not least Oceania Aviation talks us through changing roles of helicopters, and how emerging technologies are helping helicopters expand their capabilities.

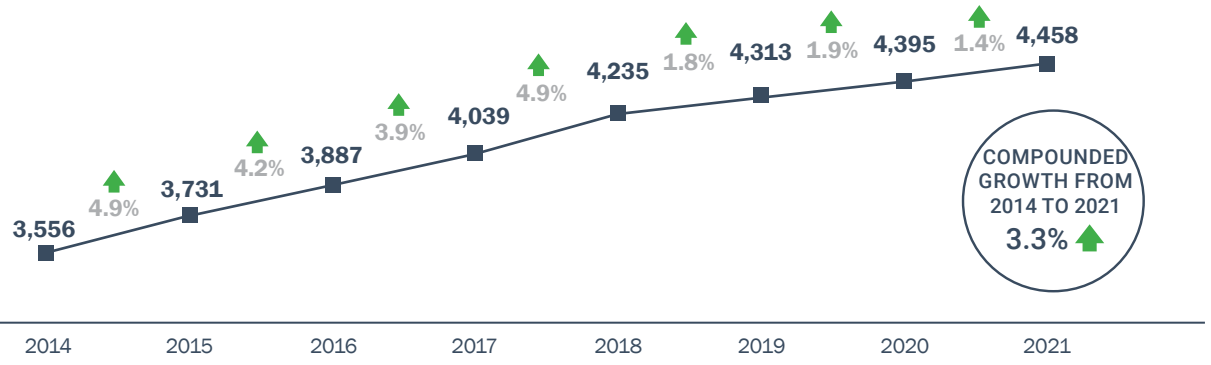
Sincerely,
Alud Davies
Media & Communications Director,
Asian Sky Group & Asian Sky Media

EXECUTIVE SUMMARY

AS OF THE END OF 2021, THERE WERE A TOTAL OF 4,458 CIVIL TURBINE HELICOPTERS IN OPERATION IN THE ASIA-PACIFIC REGION. THE HELICOPTER FLEET GREW BY 63 UNITS IN 2021 AND ACHIEVED Y-O-Y GROWTH OF 1.4% FROM THE 4,395 UNITS AT THE END OF 2020. THE REGION HAS SEEN COMPOUND Y-O-Y GROWTH OF AROUND 3.3% SINCE 2014 WITH THE ADDITION OF 902 AIRCRAFT. THE DEMAND FOR HELICOPTERS, WHICH REACHED ITS PEAK IN 2018 CONTINUED TO SLOW IN 2021. THIS WAS DUE TO THE IMPACT OF THE COVID-19 PANDEMIC. THE GLOBAL ECONOMY, AS WELL AS THE INDUSTRY, ARE STILL NAVIGATING PANDEMIC-RELATED SETBACKS, INCLUDING SUPPLY CHAIN AND WORKFORCE ISSUES, INCLUDING A DECLINE IN STUDENT PILOT NUMBERS.

HELICOPTER FLEET GROWTH

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



Overall, there were 393 changes to Asia-Pacific's helicopter fleet in 2021, an increase from the 308 in 2020. This was composed of 91 new deliveries, 137 pre-owned additions, and 165 deductions.

The configuration of more than half (57%) of Asia-Pacific's turbine helicopter fleet was utility, which were used for multi-mission operations in 2021 - a rise of about 2.5% since 2020. The remaining fleet was configured as VIP (16%), Law Enforcement (7%), Offshore (7%), SAR (6%), EMS (6%), and Training (2%). Utility, VIP and Training configured helicopters saw net additions, while Law Enforcement stayed the same as in 2020. With the exception of the above, every other category saw a net deduction in 2021. The EMS configured fleet experienced the largest reduction, by 29 units. This was followed by helicopters with SAR and Offshore configurations – by four and two units, respectively.

In terms of fleet value[1] , utility configured helicopters accounted for nearly 45% of the total value of US$32.2 billion. Notably, although offshore and SAR configured helicopters accounted for less than 10% of the total fleet, they were 16% and 10% of the total fleet value, respectively.

Airbus Helicopters (1,860 units), Bell (1,233 units), and Leonardo (468 units) remained the top three OEMs in the Asia-Pacific region with 42%, 28%, and 10% market share, respectively. Bell and Airbus were the best performers in terms of net additions, by adding 39 units and 21 units since 2020, while Leonardo and Sikorsky Helicopters saw net deductions of 15 units and four units over the same period.

As was the case in 2020, single-engine helicopters were the most popular size category in 2021, with more than half of the fleet (53%) belonging to this category. Medium size helicopters came second, but only had a market share of 23%, followed by light twin helicopters with 18% market share.

[1]Fleet value is calculated by aircraft's "replacement cost". The actual fleet value might be lower than what stated here.

NET FLEET GROWTH

HELICOPTER FLEET MARKET SHARE

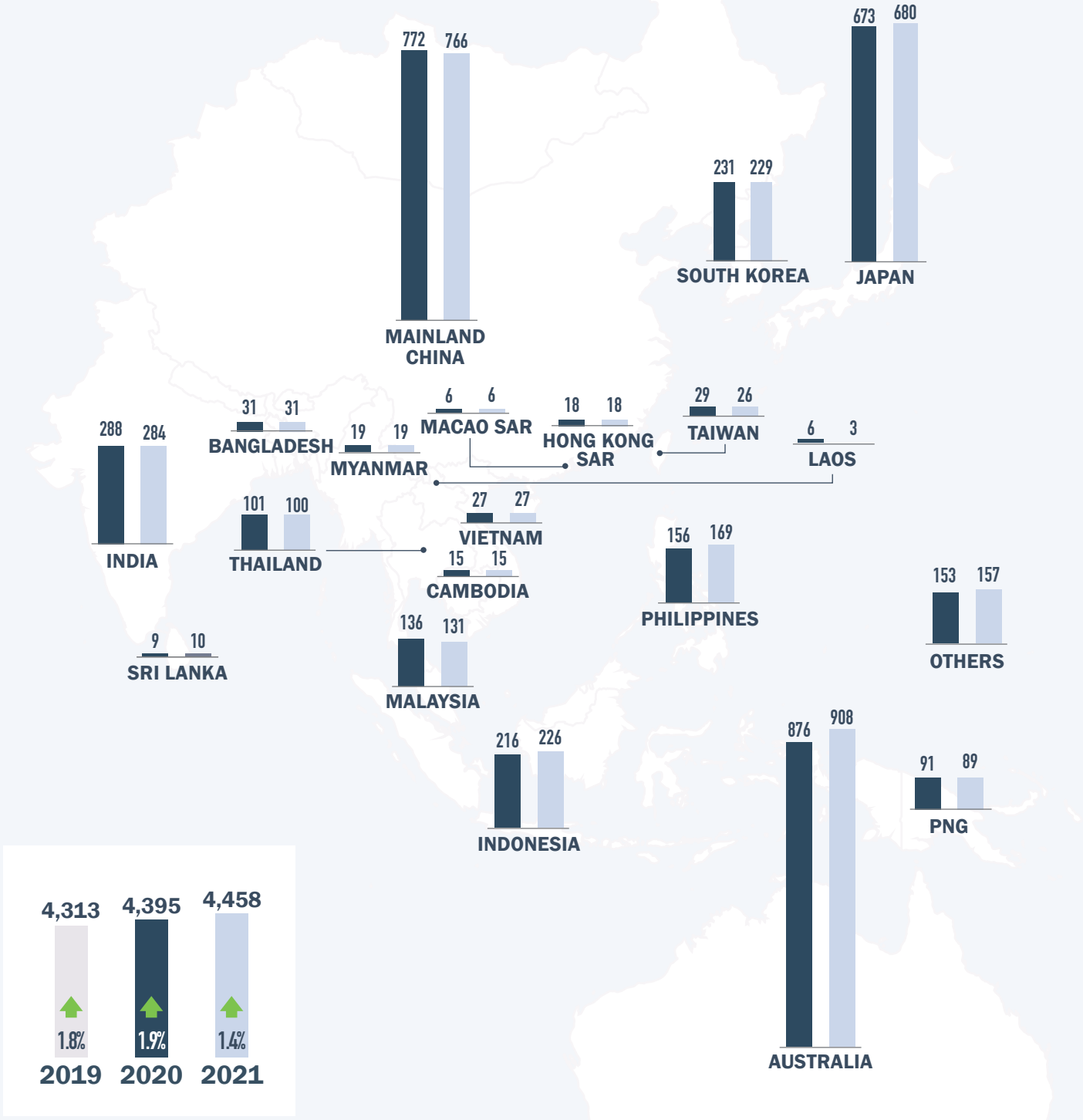
OEM	Fleet Size (Units)	Replacement Cost (Million USD)
AIRBUS	1,860 **(42%)**	12,853 **(40%)**
BELL	1,233 **(28%)**	6,337 **(20%)**
LEONARDO	468 **(10%)**	5,653 **(18%)**
MD	241 **(5%)**	700 **(2%)**
SIKORSKY	210 **(5%)**	3,860 **(12%)**
RUSSIAN HELICOPTERS	171 **(4%)**	1,740 **(5%)**
ROBINSON	123 **(3%)**	125 **(<1%)**
AVIC	53 **(1%)**	391 **(1%)**
ENSTROM	50 **(1%)**	63 **(<1%)**
OTHERS	49 **(1%)**	433 **(1%)**

Configuration	Fleet Size (Units)	Replacement Cost (Million USD)
UTILITY	2,543 **(57%)**	14,470 **(45%)**
VIP	723 **(16%)**	4,197 **(13%)**
LAW ENFORCEMENT	320 **(7%)**	2,648 **(8%)**
OFFSHORE	300 **(7%)**	5,134 **(16%)**
EMS	253 **(6%)**	2,287 **(7%)**
SAR	252 **(6%)**	3,179**(10%)**
TRAINING	67 **(2%)**	241 **(1%)**

Size Category	Fleet Size (Units)	Replacement Cost (Million USD)
SINGLE	2,346 **(53%)**	6,644 **(21%)**
MEDIUM	1,030 **(23%)**	13,650 **(42%)**
LIGHT TWIN	819 **(18%)**	6,205 **(19%)**
HEAVY	238 **(5%)**	5,236 **(16%)**
SUPER MEDIUM	25 **(1%)**	420 **(1%)**
TOTAL	**4,458**	**$32,155**

Note (1): The YE 2021 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 2021 list prices.
Note (3): SAR refers to Search and Rescue.
Note (4): EMS refers to Emergency Medical Services.
Note (5): Size Category are defined in Apendix in Page 50

REGIONAL OVERVIEW

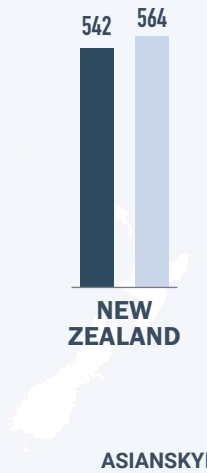


Note (1): Fleet distribution is based on turbine helicopters in service and their active bases of operation.
Note (2): Regions are defined in appendix.
Note (3): Others include Vanuatu, Nepal, Guam, New Caledonia, Fiji, Mongolia, Brunei, French Polynesia, Bhutan, Maldives, Solomon Islands, Singapore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

The largest market in Asia-Pacific is Australia – with 908 operational civil turbine helicopters at the end of 2021. This was followed by mainland China, Japan, New Zealand, and India, with 766, 680, 564, and 284 helicopters, respectively. Altogether, the fleet size of the top five countries accounted for more than 70% of the total 4,458 turbine helicopters in the region.

Australia and New Zealand saw the most new additions in 2021, with 32 and 22 helicopters, respectively. The Philippines and Indonesia also saw notable increases in their fleets. However, mainland China, which previously saw the most additions in 2020 with 54 units, has now recorded the most deductions in 2021 – six.

Oceania saw the greatest increase in turbine helicopters in 2021 with 51 units, equivalent to 3% growth since the end of 2020. Southeast Asia and East Asia also experienced an increase in their helicopter fleets by 14 units (2% growth) and seven units (1% growth) respectively. Greater China, the only region to see negative growth in 2021, dropped from the top to the bottom in ranking, mainly as a result of a major EMS operator's bankruptcy and its fleet being stored.



HELICOPTER FLEET (TURBINE ONLY)

LARGEST MARKET
908
AUSTRALIA

MOST NET ADDITIONS
+32
AUSTRALIA

MOST NET DEDUCTIONS
-6
MAINLAND CHINA

FLEET GROWTH IN MAJOR MARKETS

	Net Fleet Growth		Growth Rate	
REGION	**2020**	**2021**	**2020**	**2021**
Oceania	+20	+51	1% ↑	3% ↑
Southeast Asia	-10	+14	-1% ↓	2% ↑
East Asia	+11	+7	1% ↑	1% ↑
South Asia	+7	-	2% ↑	-
Greater China	+54	-9	7% ↑	-1% ↓
TOTAL	**+82**	**+63**	**1.9%** ↑	**1.4%** ↑

	Net Fleet Growth		Growth Rate	
COUNTRY/REGION	**2020**	**2021**	**2020**	**2021**
Australia	+23	+32	3% ↑	4% ↑
New Zealand	+8	+22	1% ↑	4% ↑
Philippines	+1	+13	1% ↑	8% ↑
Indonesia	-3	+10	-1% ↓	5% ↑
Japan	+9	+7	1% ↑	1% ↑
Sri Lanka	-1	+1	-10% ↓	11% ↑
Macao SAR	-	-	-	-
Hong Kong SAR	-5	-	-22% ↓	-
Vietnam	+2	-	8% ↑	-
Bangladesh	+2	-	7% ↑	-
Cambodia	+1	-	7% ↑	-
Myanmar	-	-	-	-
Thailand	-7	-1	-6% ↓	-1% ↓
Papua New Guinea	-12	-2	-12% ↓	-2% ↓
South Korea	-1	-2	-	-1% ↓
Taiwan	+5	-3	21% ↑	-10% ↓
Laos	-	-3	-	-50% ↓
India	+3	-4	1% ↑	-1% ↓
Malaysia	-3	-5	-2% ↓	-4% ↓
Mainland China	+54	-6	8% ↑	-1% ↓
Others	+6	+4	4% ↑	3% ↑
TOTAL	**+82**	**+63**	**1.9%** ↑	**1.4%** ↑

Rank by 2021 net fleet growth from the largest.

COUNTRY SNAPSHOTS

FOR FULL COUNTRY PROFILES PLEASE VISIT: **WWW.ASIANSKYMEDIA.COM**

AUSTRALIA

Being the largest and most mature civil turbine helicopter market in APAC, Australia's fleet totaled 908 helicopters at the end of 2021. This was 32 more helicopters when compared to 2020. 2021 saw 30 helicopters leaving, whilst ten new and 52 pre-owned helicopters were added. Australia's SAR segment also saw the most deductions in 2021 – four fewer than 2020.

GREATER CHINA

Greater China, which includes mainland China, Hong Kong SAR, Macao SAR, and Taiwan, had a total of 816 helicopters in 2021. This was nine less than 2020, mainly resulting from six deductions from mainland China. 2021 also saw three helicopters deducted from Taiwan. There were no changes to the helicopter fleets in Macao and Hong Kong. Overall, in Greater China, the H125 and Bell 407 dominated the fleet.

JAPAN

Japan ranked third in Asia-Pacific with 680 helicopters during 2021. Compared to 2020, there were seven additional helicopters, equivalent to a growth rate of 1%. Japan also remained at the top in the EMS segment, with 84 helicopters at the end of 2021.

NEW ZEALAND

New Zealand had 564 helicopters in its fleet at the end of 2021, having seen a net addition of 22 helicopters during the year. There were 36 pre-owned additions and five new deliveries, whilst 19 helicopters left the country.

INDIA

India had 284 helicopters at the end of 2021, which was four fewer than in 2020. This gave the country a negative growth rate of -1%. India also ranked third in Asia-Pacific in the offshore segment, with 47 helicopters at the end of 2021.

SOUTH KOREA

South Korea's fleet saw a 1% drop between 2020 and 2021, leaving the country with a total of 229 aircraft. This decrease is mainly the result of the reduction in the offshore segment. Russian Helicopters had the biggest market share in South Korea.

INDONESIA

Seeing a net fleet addition in 2021 with ten aircraft, Indonesia's helicopter fleet had nine new deliveries, 12 pre-owned helicopter additions, and 11 reductions. The offshore segment also saw a continuous reduction in fleet size between 2019 and 2021.

MALAYSIA

Malaysia had 131 helicopters in 2021 - five less than at the end of 2020. The country's fleet gained four new and eight pre-owned helicopters in 2021, however, 17 aircraft also left its fleet.

PAPUA NEW GUINEA (PNG)

PNG's helicopter fleet decreased by 2%, however, it was a much smaller decrease compared to 2020s 12%. In total, three pre-owned aircraft joined the fleet, with five aircraft also leaving in 2021.

PHILIPPINES

The Philippines saw an overall addition of 13 helicopters in 2021, thus contributing to the country's increase in ranking for net fleet growth in 2021. The Philippines jumped from the ninth to third rank, with an 8% growth rate. Although five helicopters did leave the country, nine new and nine pre-owned helicopters also joined.

THAILAND

The country had 100 helicopters at the end of 2021, with only a net deduction of one helicopter in the year, making it a reduction of 1% over 2020. As such, the decline has slowed down since 2020. Overall, there were four pre-owned helicopter additions, whilst five helicopters were also removed.

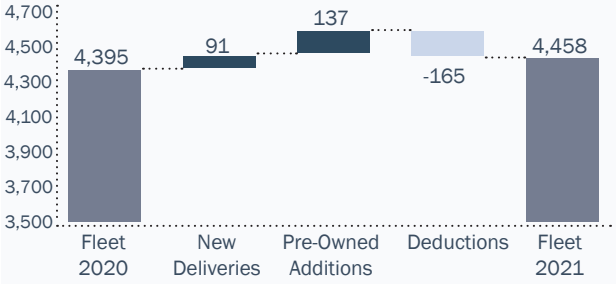
TOTAL FLEET BY COUNTRY/REGION

4,458 in Total

	AIRBUS	BELL	LEONARDO	MD	SIKORSKY	RUSSIAN HELICOPTERS	ROBINSON	AVICOPTER	ENSTROM	OTHERS	TOTAL	% OF TOTAL
AUSTRALIA	339	391	92	17	24		35		2	8	908	20%
MAINLAND CHINA	268	218	63	3	44	60	27	53	27	3	766	17%
JAPAN	354	133	128	15	27	1	19			3	680	15%
NEW ZEALAND	307	119	10	112	7		4		1	4	564	13%
INDIA	114	84	41	3	7	8	3			24	284	6%
SOUTH KOREA	52	35	28	4	45	61			2	2	229	5%
INDONESIA	87	72	22	3	12	10	3		17		226	5%
PHILIPPINES	90	40	17	12	2		7		1		169	4%
MALAYSIA	67	16	35		10		3				131	3%
THAILAND	28	53	8		8	3					100	2%
PAPUA NEW GUINEA	31	48			1	5	1			3	89	2%
BANGLADESH	4	11	3				13				31	1%
VIETNAM	11	2	3			11					27	1%
TAIWAN	10		2		14						26	1%
MYANMAR	7		7		5						19	<1%
HONG KONG SAR	10			6			2				18	<1%
CAMBODIA	12	3									15	<1%
SRI LANKA	5	1				3	1				10	<1%
MACAO SAR			6								6	<1%
LAOS	2					1					3	<1%
OTHERS	62	7	3	66	4	8	5			2	157	4%
TOTAL	1,860	1,233	468	241	210	171	123	53	50	49	4,458	100%

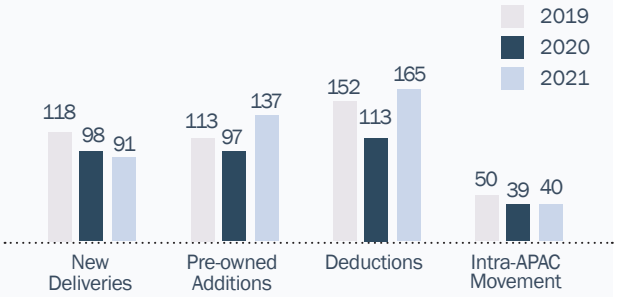
MARKET TRENDS

ADDITIONS AND DEDUCTIONS



Asia-Pacific's civil turbine helicopter fleet stood at 4,458 at the end of 2021 – an increase of around 1.4% compared to the 4,395 helicopters at the end of 2020. The overall helicopter market has been slowly growing since 2014. The fleet saw total net growth of 63 units in 2021, as a result of 91 new deliveries, 137 pre-owned additions, and 165 deductions. These deductions included out-of-region transactions, helicopter retirements, and units placed in storage. Out of the 165 deductions, 61 (37%) were over 20 years old. Moreover, a total of 40 helicopters changed operating bases within APAC, however, this did not impact the total number of the regional fleet.

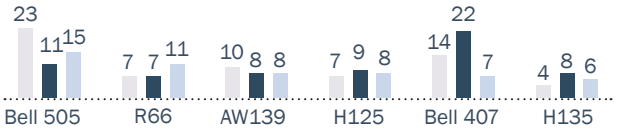
HISTORICAL FLEET CHANGES



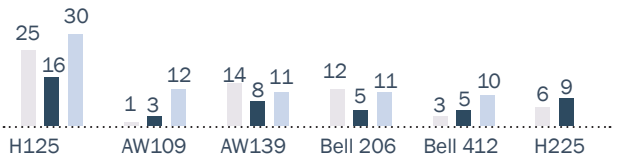
The number of pre-owned additions and deductions, which had both decreased in 2020, saw a sharp spike in 2021 - around 41% and 46%, respectively. The growth in pre-owned additions is largely a result of an increase of 37 helicopters in Australia and 28 in New Zealand, whilst the Philippines and Indonesia, two countries with no pre-owned additions in 2020, each added around ten helicopters in 2021. Shanghai Kingwing, a major operator in mainland China, declared bankruptcy, and all 39 of its helicopters were put into storage. A total of 53 helicopters moved out of APAC.

2019 2020 2021

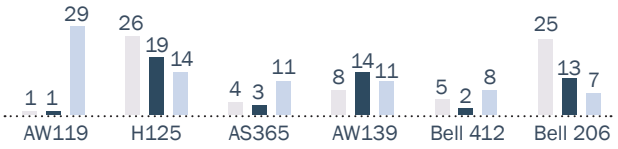
NEW DELIVERIES



PRE-OWNED ADDITIONS



DEDUCTIONS



Note: Rank by 2021 net fleet change from the largest

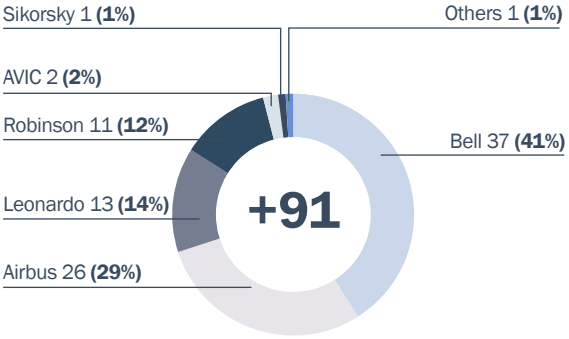
Bell had the most deliveries into APAC in 2021, with 37 units (41%). Coming next was Airbus Helicopters and Leonardo, with 26 (29%) and 13 (14%) respectively. In total, 67 (74%) of newly delivered helicopters had a utility configuration and were used for multi-mission operations. However, the Bell 407, which was 2020's most popular newly delivered helicopter, saw the steepest drop in new delivery numbers during 2021, with a decrease of 15 units. Because of this the Bell 505 overtook the Bell 407 as the most popular newly delivered model in 2021, with 15 units (16%). The Robinson R66 was next, with 11 new deliveries (12%) – the only other model that saw significant growth.

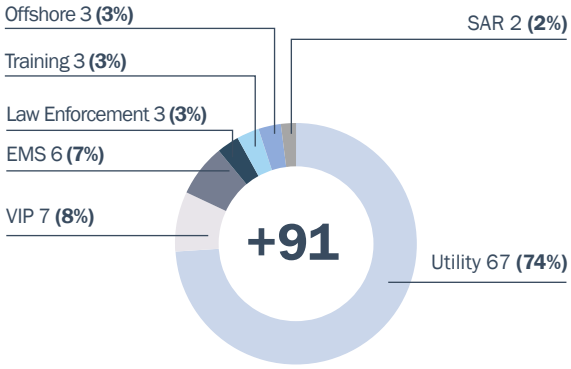
Out of the 137 pre-owned additions, 52 units (38%) were Airbus Helicopters, 30 (22%) were Bell, and 24 (18%) were Leonardo. The most popular pre-owned model remained the Airbus H125, with 30 units (22%), followed by the Leonardo AW109 with 12 units (9%). Although it is worth noting that the second-ranked H225 in 2020 is not on the list in 2021.

Of the 165 deductions, 57 units (34%) were Airbus Helicopters, 52 units (31%) were Leonardo, and 28 units (17%) were Bell. The Leonardo AW119 saw the largest deduction from the Asia-Pacific fleet, with 29 units (18%). This was followed by the H125 with 14 units (8%).

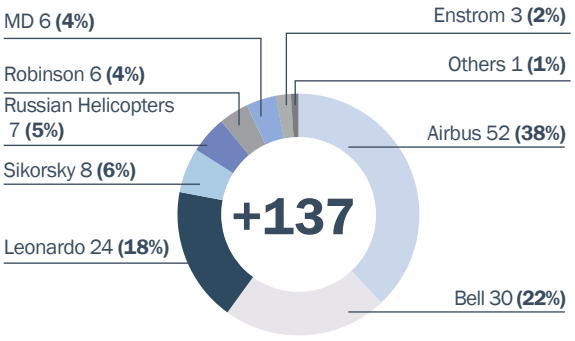
FLEET CHANGES BY OEM AND CONFIGURATION

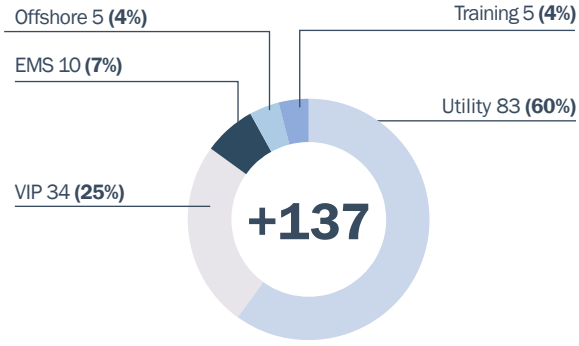
New Deliveries



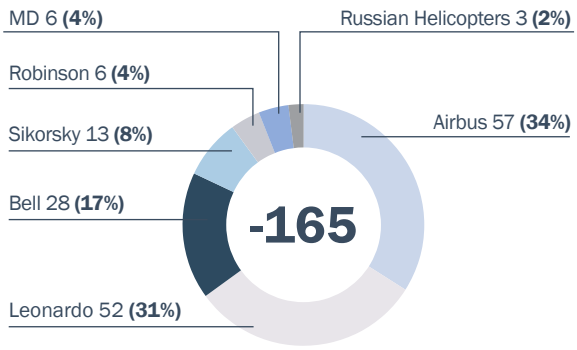


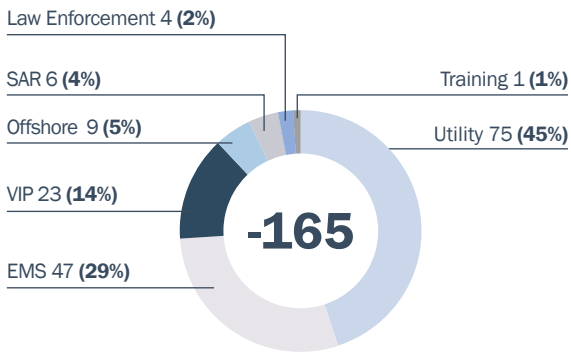
Pre-owned Additions





Deductions





HELICOPTER ROLE EQUIPMENT WITH OCEANIA AVIATION: EXPANDING CAPABILITIES, FUNCTIONALITY AND REVENUE

Newly emerging and developing aviation technologies (alongside a global pandemic that continues to change the playing field!) means that the needs and capabilities of helicopter operators are constantly evolving. The role equipment industry, which serves to add functionality to aircraft, continues to adapt and grow as a response to these evolving operational needs.

Oceania Aviation is an aviation support provider based in New Zealand but with a large global customer base, offering everything from aircraft and part sales to maintenance, repair and overhaul across airframes, engines and components. However, it is the company's Airborne Systems division - focused on role equipment design, manufacturing, and installation - that is truly making waves, both in New Zealand and across international markets such as North America, Asia and beyond. Asian Sky Group's Alud Davies chatted to Oceania's Head of Operations, Grant Crenfeldt, to find out more about helicopter role equipment and how it assists operators in increasing their functionality, expanding their capabilities and growing revenue for aviation businesses.

So first of all – can you explain for those that aren't so familiar, what exactly role equipment is and the type of products this includes?

Role equipment, sometimes referred to simply as modifications, covers any specialist equipment that can expand the role and capability of a helicopter to suit the needs of its operator. This includes a wide range of products - it could be cargo pods or baskets, which allow the aircraft to carry hard-to-transport equipment, spray systems for aerial agriculture work, cargo hooks and systems to allow transport of loads external to the aircraft, and control systems that allow for the operation of these types of equipment. Operators who invest in role equipment are usually seeking additional capabilities that will enhance their business operations, whether it be within the utility sector, for agricultural operators, or tourism providers. For example, aerial firefighting operators will have some sort of cargo swing system working in conjunction with a monsoon bucket that holds thousands of litres of water to 'drop' as required. For commercial helicopter operators involved in adventure tourism, equipment such as bike racks can allow transport of mountain bikes into otherwise inaccessible terrain, and cargo pods can carry equipment such as snow gear, hunting and fishing equipment that can't be carried inside the aircraft.

How did Oceania Aviation get into the role equipment industry, having started out as a parts sales and MRO provider?

Oceania Aviation's history dates back to 1992 with the sale of a pair of MD helicopter blades, evolving into a full-service MRO business over the following decade. Our role equipment division (Airborne Systems) started in the early 2000s as a smaller side project, working out of Oceania's large Harvard Lane projects hangar in Ardmore Airport, Auckland. At its inception, Airborne Systems was essentially an optional additional service for customers who purchased aircraft from Oceania and wanted to add additional

capabilities. Basically, the team would provide modifications, largely cargo swings to start with, for existing customers who asked for those additional capabilities. Since the Airborne team was able to create customized products in-house, they were able to keep the costs down for the operator, and over a short period of time, we started to see more and more requests for this type of equipment. From there, significant growth and demand came fairly organically. The hangar got busier and more well-known throughout the local industry, and an increasing number of aircraft were sold by Oceania to either tourist operators or agriculture operators - who requested further products which had to be designed, built, and installed from scratch. The division now operates from a larger purpose-built workshop, where many of our role equipment solutions are designed, prototyped, and manufactured for new and existing customers.

Tell us more about the role equipment product range that Oceania Aviation offers – are there particular products that are most popular?

Our Airborne Systems division has around 400 modifications that we own, showing the extent to which the team provides specific and unique solutions for our customers. In addition to these mods, Oceania has gained around a dozen Supplemental Type Certificates (STCs), allowing the equipment or modification to be used across any aircraft of the same model type and is usually pursued when there is significant demand for that equipment or modification. So the products for which we have gained STCs are naturally our most popular equipment. Leading the way certainly in New Zealand and Australia, but also starting to see healthy demand internationally, is our AS350 Spray System, which enables operators to carry and dispense over 1000 litres for agricultural spraying. We also have a Spray System for the MD500 and are in development for other helicopter models (watch this space!). Our AS350 Cargo Pod is also very popular amongst tourism operators, and international demand has led us to gain FAA and Transport Canada certification alongside the NZCAA STC which covers New Zealand and Australia. Other popular products include our AS350 Cargo Swing System, the AS350 Bike Rack and our AS350 Seat Shift Kit (for external load operations). Obviously, a lot of our popular products are designed for the AS350, and this is because of the high proportion of these Airbus models across New Zealand and Australia – the original rotary markets our Airborne Systems division started manufacturing for. We have made many modifications/products for Bell, MD and other OEMs though – and as we continue to see more and more demand for equipment designed for other helicopter types, we will continue to meet this demand and pursue STCs for our most popular systems across particular OEMs and helicopter types.

And you're currently pursuing FAA certification for your popular AS350 Spray System, correct?

Yes, we are currently going through the process to seek approval for our AS350 Spray system and hope to have this completed late 2022. We will have a full system displayed under a Helicopter at HAI so our customers can experience how easy it is to take on and off an aircraft. Like most of our products, the catalyst for seeking this approval came from organic customer demand. Thanks to our US-based sister company, Heli Parts Network (HPN), we have some strong relationships in this market. Having recently worked on a number of AS350 reconfigurations and refurbishments from our Nevada-based hangar for aircraft sales customers in the US, we had several customers mention that they would love to add our Spray System to the turnkey package we offer. This set the wheels in motion to discuss the opportunity with several other partners throughout the US, and we found that there is strong

market demand – feedback was that there isn't a system that matches ours in terms of weight, functionality and capacity. We are super excited to be able to display our Spray System at the HAI Heli Expo, as we know that many major global operators and all our OEM partners will be attending, being one of the largest helicopter events of the year. We welcome any Asian Sky Media readers to come and check it out (and chat to our team) at Booth #7444 – we'll have our Airborne Systems Manager there to provide any advice, information and expertise around role equipment you may be seeking.

Regarding the Supplemental Type Certificate – is this a difficult/lengthy process?

Understandably, modifying the capability of a helicopter, and thus the weight or balance of the aircraft, requires a rigorous certification process. STCs require approval from the industry regulator, which means that the approval process is more stringent and can take a lot longer than a one-off modification. The process of certification involves collaboration with a Part 146 design company to design and validate a tailored concept, before building a prototype. Once the design and all documentation are finalized between the two parties and a prototype has been signed off, everything goes to the regulator to assess for certification. The STC process also requires vigorous testing, including flight tests for larger equipment (such as spray systems and cargo pods). The timeline to secure an STC can vary, depending on the time taken to design and build the new product, as well as the schedule of the regulator – be that the NZCAA (New Zealand), FAA (United States), or other jurisdictions. As I said earlier, we will be seeking FAA approval for our AS350 Spray Systems and hope to have this completed later in 2022. We are optimistic that this is an achievable goal, given that we already have certification by the NZCAA, and it is a case of validating the certification for the US market (as opposed to developing a 'new' product and having it certified for the first time).

Do you outsource much of your role equipment design and manufacturing? Tell us about the team based in New Zealand.

As mentioned, we do work with a Part 146 certified design organization as part of the product design process. We're proud to also have an extensive in-house team of engineers, design engineers and manufacturing specialists that look after our role equipment business within the Airborne Systems division. This is complemented by our Blades and Composites facility and team, which specializes in the overhaul and repair of composite rotor blades as well as a range of other composite repairs and modifications. We used to outsource some of our composites manufacturing as we previously didn't have the in-house capabilities (we would use a composites partner organization to manufacture our spray tanks and pods), but as of late last year, we entered into a partnership with Aero Composites to buy their manufacturing equipment as well as bringing a design engineer from their team onboard. This has accelerated our growth and expansion, allowing us to have all composites manufacturing done in-house and with even more experience and capability added to the team. The large-scale manufacturing equipment that we now have set up within our Composites division means that we are able to manufacture two spray tanks per month, with the view to increase this capacity to four per month in the near future to keep up with forecasted demand.

And finally, what's the future looking like for role equipment and Oceania Aviation's place in the industry?

Technological developments in the rotary space continue to evolve at a rapid pace, and for Oceania Aviation we feel that it's about bringing these technologies in, to work in a complementary way to our own ongoing developments. There is a lot of opportunity in adapting traditionally land-based agricultural systems to helicopters and Unmanned Aerial Vehicles (UAVs), which means producing smaller and lighter systems that are specialized for aviation specifically - this also works well with our expertise in producing lightweight composite products. Developing technology does require our teams to stay on their toes; as new versions of aircraft, components and systems come out, we need to be able to modify our designs and sometimes re-certify installations that were using previous technology. But it also provides significant opportunities to adopt and offer new capabilities, products, and ideas to our customers as the technology evolves.

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OPERATOR OVERVIEW

There were a total of 699 helicopters with the top commercial helicopter operators with more than 20 turbine helicopters in the Asia-Pacific region in 2021, making up 16% of the total fleet.

As in 2020, CITIC Offshore Helicopter Co. (COHC) operated the largest fleet, with 85 helicopters in total, closely followed by Aero Asahi (66), and Nakanihon Air (65). Of the top 20 regional operators, seven were based in, and primarily operate, in China, five in Australia, and three in Japan. Compared to 2020, due to the bankruptcy of Kingwing which ranked fourth and was one of the primary operators in China, Australia jumped up one more place in the ranking.

Nine operators saw their fleets increase in 2021, while six operators saw their fleets contract. The fleet size of five operators did not change.

COHC retained the top spot among the top 20 operators, as well as in the top six offshore operators. With the addition of a further seven units to its fleet, COHC remained the largest helicopter operator in Asia-Pacific.

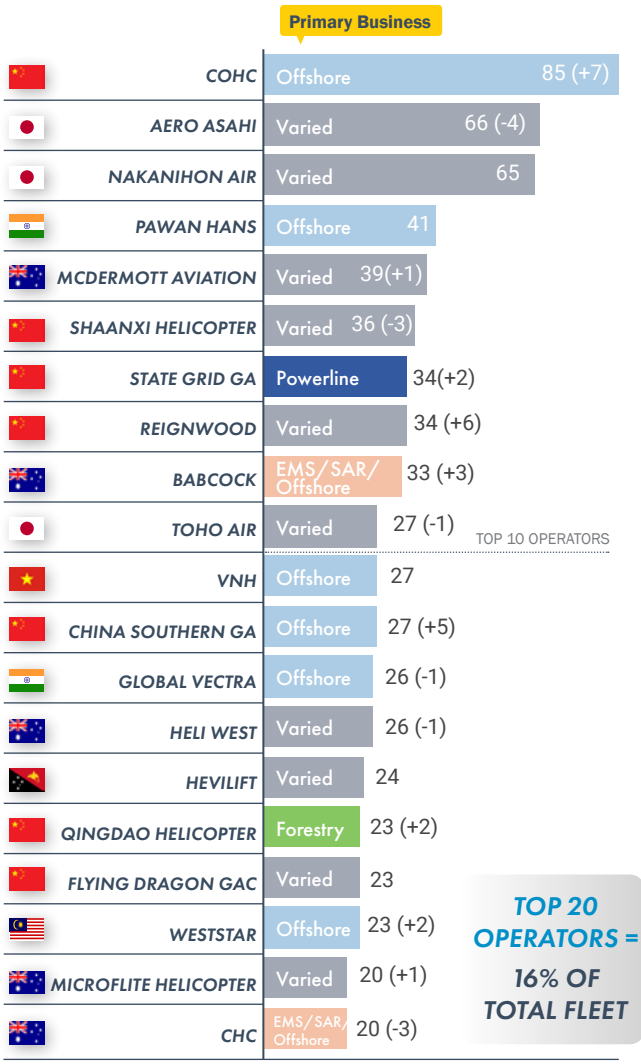
Both the second and the third place in the ranking are occupied by Japanese operators. Aero Asahi and Nakanihon Air maintained their ranking successfully, but Aero Asahi's fleet decreased by four units while Nakanihon Air had no change.

Second only to COHC's growth, Reignwood, the distributor of Bell, Robinson and Cessna in mainland China, added six helicopters, with 34 in total at the end of 2021. China Southern GA, which increased by five units, had a fleet of 27 helicopters, and climbed eight spots in the ranking.

The operator that saw the most fleet deductions during 2021 was Aero Asahi, which saw four helicopters leave its fleet. Shaanxi Helicopter and CHC came next, both with reductions of three helicopters.

TOP COMMERCIAL OPERATORS

With more than 20 turbine helicopters in Asia-Pacific



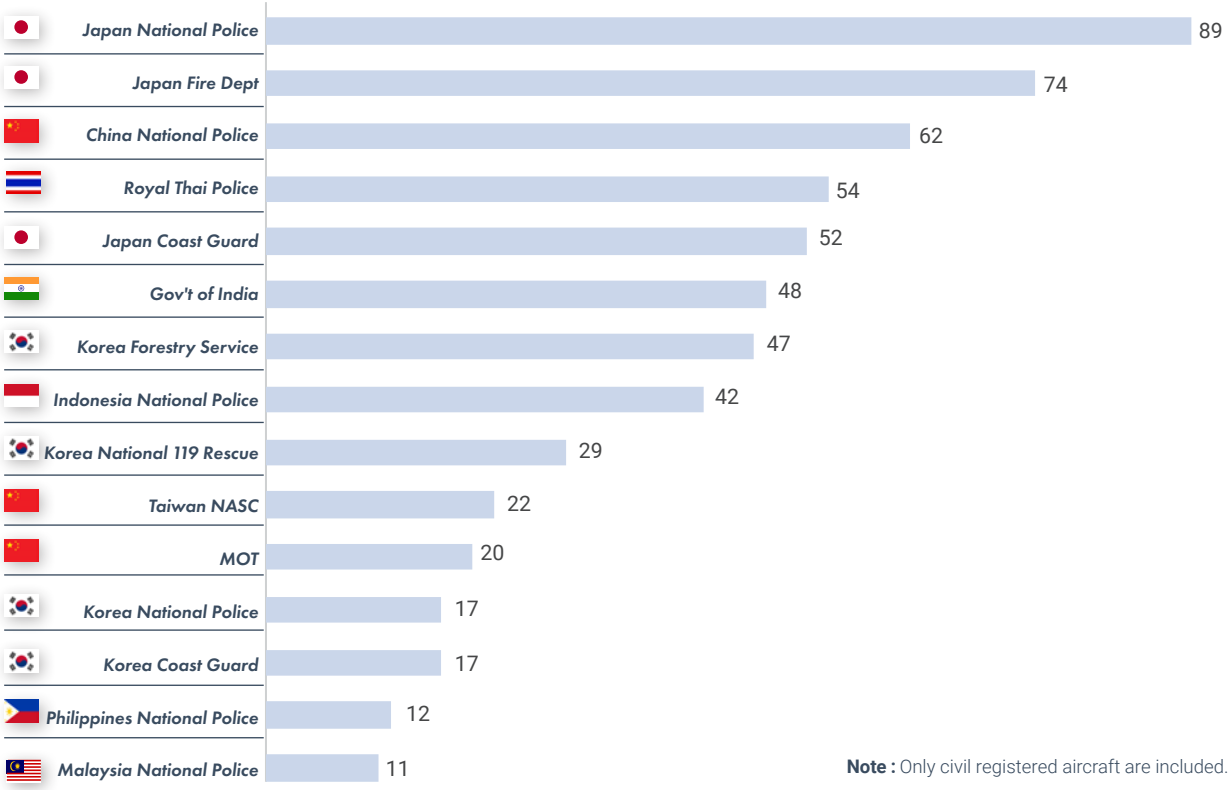
TOP 20 OPERATORS = 16% OF TOTAL FLEET

Several Australian operators were spread amongst the top 20 operators list. McDermott Aviation had a small increase in its fleet and jumped up two places in the ranking. Babcock also expanded its fleet size by adding three more helicopters but without any rank change. Heli West dropped one place with one unit leaving its fleet. Similarly, CHC dropped three ranks when three aircraft were deducted. What is noteworthy is that Microflite Helicopter took Kingwing's place and jumped into the top 20 rankings.

There were also two Indian operators in the list. Pawan Hans moved up from fifth to fourth place in the ranking despite no change in its fleet number, whilst Global Vectra decreased its fleet by one aircraft in 2021 and dropped one place. Weststar was the only Malaysian operator on the list. It added two more aircraft in 2021 and climbed to No. 18. Interestingly, there was no change both in the ranking and fleet number of Hevilift.

TOP GOVERNMENT OPERATORS

With more than 10 turbine helicopters



Note : Only civil registered aircraft are included.

Apart from commercial operator, government operators are also an essential part of helicopter operations in the Asia-Pacific region. At the end of December 2021, 655 turbine helicopters were operated by government operators - 15% of the total helicopter fleet in the region.

Overall, the largest fleet in the region consisted of 89 helicopters and was operated by the Japan National Police. This was followed by the Japan Fire Department with 74, and China National Police with 62.

Japan, the country with the biggest government fleet in APAC, operated 226 turbine helicopters through its different government departments: Japan National Police (89), Japan Fire Dept (74), Japan Coast Guard (52), and the remaining 11 helicopters operated in smaller numbers by a variety of government agencies.

Mainland China and Hong Kong SAR, as well as Taiwan, came next behind Japan, operating 119 government helicopters together. Those operators were China National Police (62), Taiwan NASC (22), the Ministry of Transportation (20), HK Government Flying Service (nine), and Civil Aviation Flight University of China (six).

South Korea took the third place with multiple government operators: Korea Forestry Service (47 helicopters), Korea National 119 Rescue (29), Korea National Police (17), and Korea Coast Guard (17).

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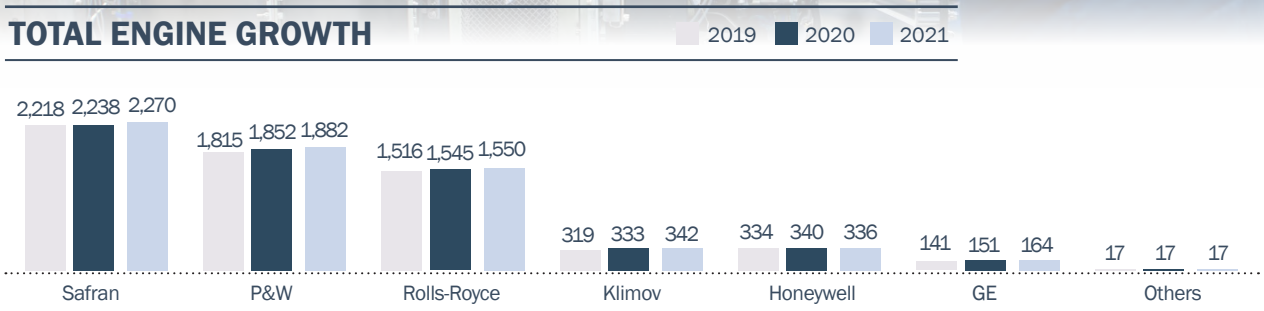
ENGINE OEM OVERVIEW

TOTAL ENGINE GROWTH



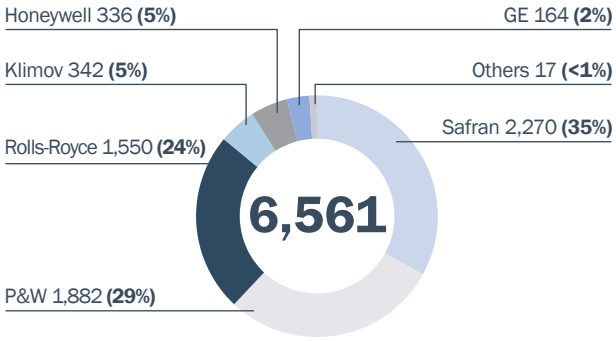
Asia-Pacific was home to 4,458 civil turbine helicopters, which were powered by a total of 6,561 turbo-shaft engines at the end of 2021. The most popular engine OEM in the region remained Safran, accounting for 2,270 engines (35% of the total). Pratt & Whitney, alongside Rolls-Royce, came second, with 1,882 engines (29%) and 1,550 (24&) engines, respectively. Safran beat Pratt & Whitney as the OEM that experienced the biggest net growth in APAC during 2021, with the number of its engines increasing by 32 (making growth of around 1.4% since the end of 2020.)

2021 also saw Safran power 1,677 of the total 4,458 helicopters. Additionally, 48% and 28% of helicopters using Safran engines belonged to the single and medium categories, respectively.

Rolls-Royce had the most engines in the single size category with 1,170 engines. Pratt & Whitney engines were the most popular in the light twin and medium categories, with 764 and 1,064 engines, respectively.

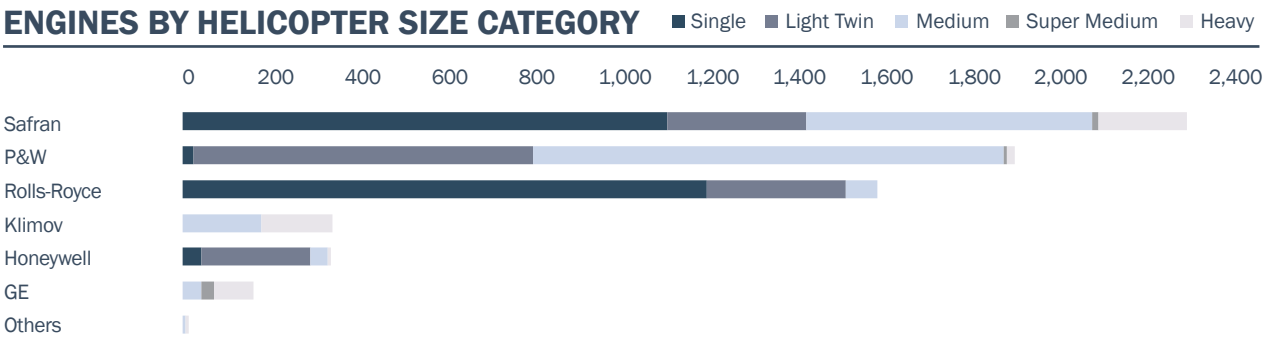
The most popular turbo-shaft engine model in APAC was Safran's Arriel family, with 1,219 helicopters using 1,613 engines. Rolls-Royce's Allison 250 came second, with 1,237 helicopters using 1,427 engines. Pratt & Whitney's most popular engine family in the region remains the PT6, with 512 helicopters using 998 engines.

ENGINE OEM MARKET SHARE



Overall, the helicopter engine market grew by 1.3% in 2021, which was lower than its 1.8% growth in 2020. This was a result of the COVID-19 pandemic, which saw the demand for helicopter travel decrease. Growth in the engine market has now slowed down for three consecutive years. Fortunately, the market is expected to boom in 2022, as the world recovers from the pandemic and more people get vaccinated, with helicopter operations projected to revert to pre-COVID levels.

ENGINES BY HELICOPTER SIZE CATEGORY



Safran's 3,500 sqm facility in Singapore

SAFRAN HELICOPTER ENGINES: CELEBRATING MORE THAN 30 YEARS IN ASIA

Interview with Valerie PATUEL, Managing Director of Safran Helicopter Engines Asia and CEO of Safran Singapore

HOW IS SAFRAN COMMITTED TO THE ASIA PACIFIC REGION?

2021 was an important milestone as it marked the 30th anniversary of our presence in Asia-Pacific. Since then our regional footprint soared with offices in Australia, China, India and Japan. This is how we ensure proximity to better serve our operators.

WHAT DOES PROXIMITY SUPPORT MEAN TO YOU?

We are committed to being responsive. Hence, we have invested in a regional stock of parts, a modern training facility and a state-of-the-art maintenance center.

Safran's team is working around the clock to make sure that our operators can fly. Users can rely on our Field Technicians and Field Representatives strategically placed close to their operations. In addition to India, Indonesia, Malaysia, Singapore and Thailand, we further boosted our proximity with a new technical Field Representative based in South Korea.

We also built a network of one-stop-shop certified maintenance and distribution centres to enhance the proximity support to all operators in the Indian subcontinent and South-East Asia. Recently we further developed this network with a fourth partner, based in the Philippines.

HOW DO YOU ENSURE YOUR CUSTOMERS ARE SATISFIED?

Helicopter operations are at the heart of what we do. To name just one example, we team up with our operators for a yearly "Asian Customer Council", a focus group where operators drive our product and services improvement plans.

In a continuous effort to satisfy our customer needs, we have been tailoring support packages to exactly meet their mission requirements with peace of mind. With this approach we can now proudly say that 50% of our customers' activities are covered under Safran's Support By the Hour programs (SBH®).

HOW IS SAFRAN DOING ITS SHARE FOR SUSTAINABILITY?

Safran Helicopter Engines is playing a key role to decarbonize the helicopter industry. We already certified all our engines to fly with up to 50% drop-in of Sustainable Aviation Fuel (SAF). Further on-going research should allow SAFs to replace 100% of fossil fuel in a near future with no required modifications on the helicopter, cutting CO_2 emissions by up to 80%.

We are actively promoting SAF usage in Asia as demonstrated by our recent partnership with ST Engineering to assist helicopter operators in this transition.

ANY OTHER INNOVATIONS?

On top of the SAF contribution, Safran is designing hybrid propulsion solutions as another key to reducing the helicopter industry's carbon footprint. By combining thermal and electrical energy, helicopters could reduce their fuel consumption by 20%, thereby reducing CO_2 emissions.

In addition to the environmental benefits, hybridization also opens up interesting perspectives on maintenance costs, noise emissions and flight safety.

CELEBRATION WITH THE AMBASSADOR OF FRANCE TO SINGAPORE AND SINGAPORE ECONOMIC DEVELOPMENT BOARD

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SAFRAN'S STATE-OF-THE-ART MAINTENANCE CENTER IN SINGAPORE

> **"WE ARE COMMITTED TO BRINGING RESPONSIVENESS AND CUSTOMISED SUPPORT TO OUR OPERATORS IN ASIA WHILE DOING OUR PART FOR A SUSTAINABLE AVIATION."**

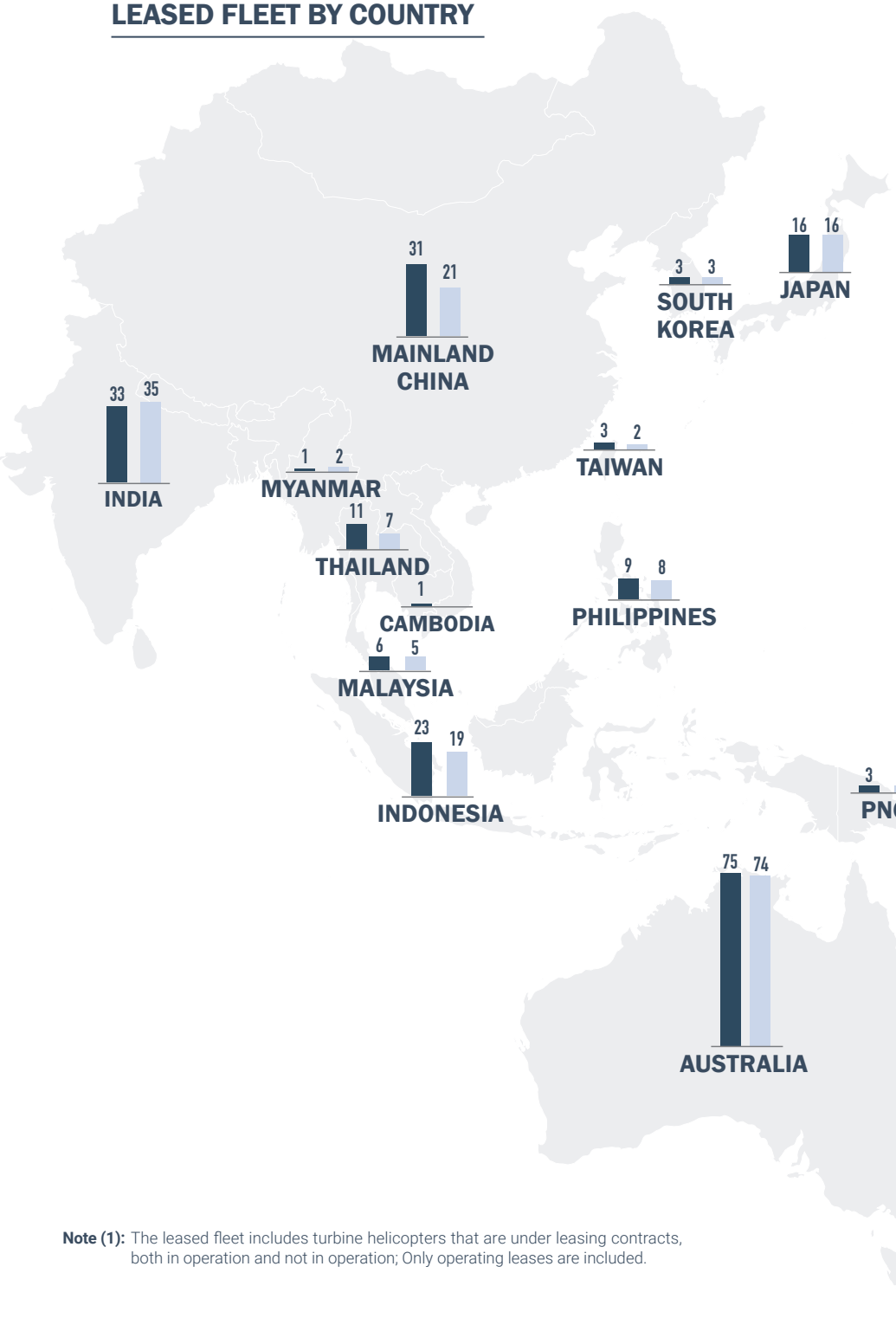
SAFRAN HELICOPTER ENGINES KEY MILESTONES IN ASIA

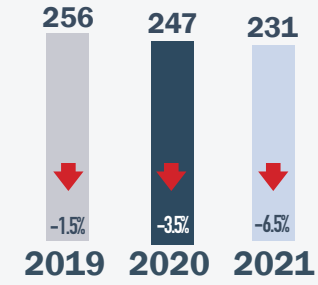
1991	Inauguration of Safran Helicopter Engines 1st facility in Singapore
1998	Opening of China, Japan and Australia offices
2010	Creation of 1st Certified Maintenance Centre in Malaysia
2016	Opening of a new state-of-the –art facility in Singapore
2021	Celebrating 30 years of customer support
2022	Partnership with ST Engineering to assist operators in SAF transition in Asia

SAFRAN

MARKET UPDATE:
LEASING MARKET

LEASED FLEET BY COUNTRY





LARGEST MARKET
74
AUSTRALIA

MOST FLEET NET ADDITIONS
+4
NEW ZEALAND

MOST FLEET NET DEDUCTIONS
-10
MAINLAND CHINA

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.

Image courtesy of Leonardo

MAJOR LESSOR MARKET SHARE

Lessor	Fleet Size (Units)	Replacement Cost (Million USD)
MILESTONE	56	953
AIRWORK	35	269
LCI	23	355
TEXTRON	13	104
MACQUARIE	12	152
CMIG	8	25
TOTAL	**163**	**$1,930**

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 2021 list prices.

The end of 2021 saw the Asia-Pacific civil turbine helicopter leasing fleet reach 231 helicopters, marking a decrease of 16 units since 2020. The market, which had been growing until 2018, has now experienced a decline in three consecutive years – falling by 1.5% in 2019, a further 3.5% in 2020, and 6.5% in 2021. Mainland China saw the steepest decline in leased units, losing ten helicopters, with most relocating out of APAC. New Zealand experienced the largest increase, with an addition of a further four helicopters.

Milestone Aviation is the biggest lessor in the APAC region with 56 helicopters in its fleet. This was despite a reduction of 15 units when compared with 2020. Major bases for Milestone include both Australia and India. Coming second and third with 35 and 23 helicopters still operating by the end of 2021 were Airwork and LCI respectively. Overall, except for Milestone, there were only small changes in the other lessor's fleets.

Regarding fleet value[1] , the 'Big Five' lessors – those with over $100 million in leased assets – Milestone, LCI, Airwork, Macquarie, and Textron, accounted for more than 70% of the total leased fleet value. Milestone had assets of US$953M, LCI had US$355M, Airwork had US$269M, Macquarie had US$152M, and Textron had US$104M.

Airbus remained the market leader with a leased fleet of 80 helicopters (35% market share) by the end of 2021. Next was Leonardo and Bell, with a leased fleet of 63 (27%) and 58 (25%) helicopters, respectively. The most popular leased helicopter model was the Leonardo AW139, with 48 units (21%). The second most popular model was the Airbus H125 with 24 units (10%), followed by the Bell 412 with 23 units (10%).

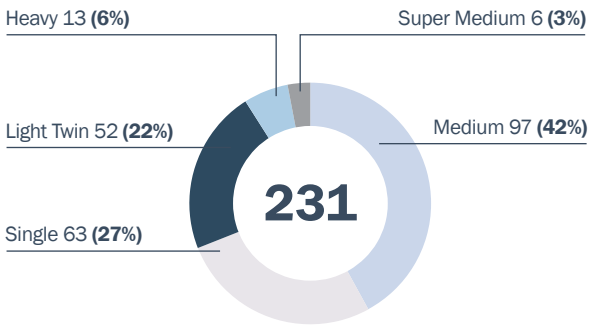
Around 40% (92 units) of helicopters leased had a utility configuration and were used for multi-mission operations. This was followed by offshore O&G and EMS configurated helicopters, with 27% (63 units) and 19% (43 units) of the total leased fleet. 2021 saw the most reductions in utility configured leased fleets, with a drop of eight units. This was followed by the EMS configured leased fleets, which decreased by six units.

Most of the leased helicopters belonged to the medium-sized category, which had 97 units (around 42% of the total leased fleet). The single-engine and light twin-size models came next, having 63 units (around 27%) and 52 units (around 22%), respectively.

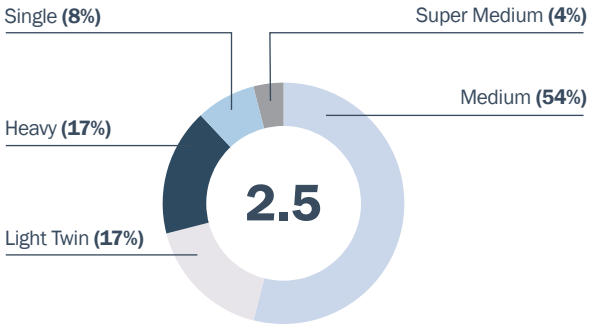
[1]Fleet value is calculated by aircraft's "replacement cost". The actual fleet value might be lower than what stated here.

LEASED FLEET BY SIZE CATEGORY

Fleet Size (Units)

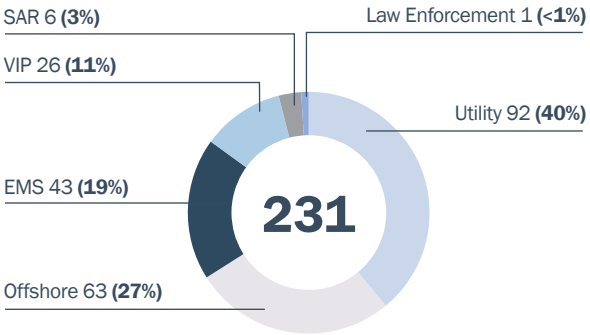


Replacement Cost ($B)

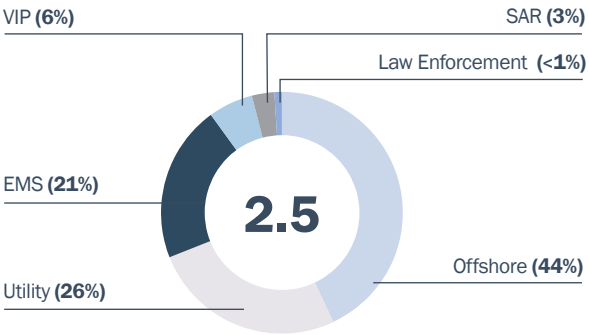


LEASED FLEET BY CONFIGURATION

Fleet Size (Units)

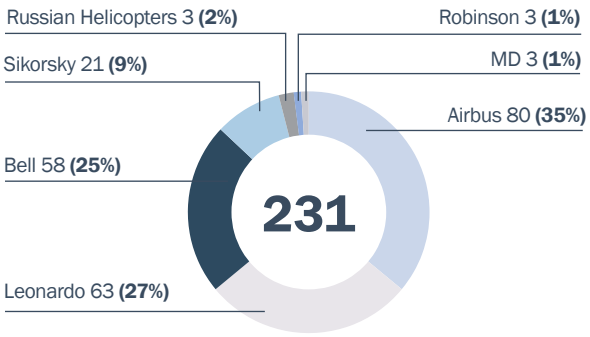


Replacement Cost ($B)

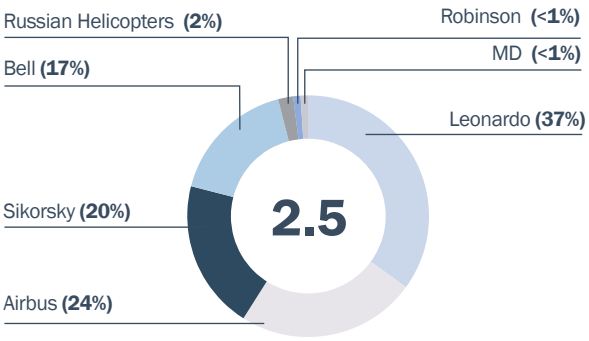


LEASED FLEET BY OEM

Fleet Size (Units)



Replacement Cost ($B)



MAJOR LESSOR (MODEL)

		MILESTONE	AIRWORK	LCI	TEXTRON	MACQUARIE	TOTAL
AIRBUS	AS355		4				**4**
	AS365	4					**4**
	BK117		20				**20**
	H125		7				**7**
	H130		2				**2**
	H135	1				1	**2**
	H145	2	2			1	**5**
	H175	2					**2**
BELL	Bell 407				4		**4**
	Bell 412	8			5		**13**
	Bell 429				4		**4**
LEONARDO	AW109	1					**1**
	AW139	14		20		6	**40**
	AW169	3		1		3	**7**
	AW189	2		2			**4**
SIKORSKY	S-76C++	7				1	**8**
	S-76D	2					**2**
	S-92	10					**10**
	Total	**56**	**35**	**23**	**13**	**12**	**139**

MAJOR LESSOR (BASE OF OPERATION)

	MILESTONE	AIRWORK	LCI	TEXTRON	MACQUARIE	TOTAL
AUSTRALIA	24	6	16	1	5	**52**
NEW ZEALAND		26			1	**27**
INDIA	17		3	4		**24**
INDONESIA	8			3		**11**
THAILAND	5		1		1	**7**
PHILIPPINES				5	1	**6**
MALAYSIA			2		1	**3**
PNG		3				**3**
TAIWAN					2	**2**
SOUTH KOREA	1				1	**2**
MAINLAND CHINA	1					**1**
MYANMAR			1			**1**
GRAND TOTAL	**56**	**35**	**23**	**13**	**12**	**139**

DYNAMIC DECADE AHEAD FOR ASIA

Despite the human and business impact of COVID-19 across the globe, the pandemic has done much to illustrate the in-built resilience of helicopter operations and the often mission-critical areas they serve. Aside from a short-term decrease in flying hours at the outset of the pandemic, the vast majority of helicopter operations continued virtually unaffected, as governments and local authorities prioritized key missions such as emergency medical services (EMS) and search and rescue (SAR), despite countries in the Asia-Pacific region going in and out of lockdowns, and movement being at times severely restricted.

Over the last twelve months, LCI too has shown its resilience and growth in many areas. The number of aircraft on its leasing and management platform grew substantially to over 140 with LCI's acquisition of Nova Capital Aviation (Ireland), it re-joined the fixed-wing market with the acquisition of an Airbus A330-300, and longstanding majority shareholder the Libra Group demonstrated its confidence in LCI's future by becoming its principal owner.

Over the past decade, the Asia-Pacific region has been a major contributor to the growth of the helicopter sector, and there is every indication this will continue for the next. By 2030, the regional economy is forecast to reach US$45.8 trillion – more than 40 percent of the global total. Against this backdrop of increasing prosperity, the demand for helicopters across the region is set to continue its fast rate of growth, which presents opportunities for the industry as a whole.

The Asia-Pacific region has long been a strategically important region for LCI. The region's dynamism is best exemplified for LCI by its rapidly growing partnership with Japan's Sumitomo Mitsui Finance and Leasing Company, Limited (SMFL). Initially formed in 2020 as a US$230 million joint venture with a fleet of 19 helicopters, this grew by 63% in 2021 with the addition of a further 12 helicopters worth over US$120 million. Their JV leases helicopters in Asia, and other global markets including EMS, SAR and transportation to offshore wind farms.

As LCI's Singapore-based Executive Vice President & Global Head of Marketing, Nigel Leishman says:

> ***"Recent world events have shown that the helicopter industry provides essential services that carried on throughout the pandemic."***

This has, in turn, generated interest among the Asian investment community, as helicopters have proven themselves as an attractive asset class. Globally, financial institutions are looking to the future and want to invest in renewable energies such as offshore wind, which is one of the sectors LCI is actively involved in in the Asia-Pacific region".

Right across the Asia-Pacific region, LCI is seeing opportunities for growth in helicopter leasing emerging in many geographic markets and operating sectors.

JASPAL JANDU
CEO

NIGEL LEISHMAN
EXECUTIVE VICE PRESIDENT & GLOBAL HEAD OF MARKETING

CHRIS LLOYD
VICE PRESIDENT MARKETING - ASIA-PACIFIC

HELICOPTER EMERGENCY MEDICAL SERVICES (HEMS)

The HEMS market in the Asia-Pacific region is well established in certain higher-income markets, such as Japan and Australia. However, in other countries, EMS is still in its infancy.

Asia's largest HEMS market is Japan, where 40 of its 47 prefectures are served by at least one helicopter, and the larger prefectures are served by multiple aircraft. There are currently over 60 twin-engine helicopters in Japan's Doctor Heli network, which dates back to 2001. Many of these helicopters are in the process of being replaced with newer generation aircraft, and this process will continue for several years to come.

The South Korean HEMS market is also recently well established, with 11 helicopters serving the country's hospital network, and plans to add further helicopters in the near future.

In Australia and New Zealand, there is a strong demand for HEMS. Australian States provide HEMS services with larger twin-engine helicopters and LCI currently leases 12 AW139s to operators for government-backed HEMS contracts. LCI expects this to grow, with further contracts set to be awarded in the near future. In New Zealand, HEMS services have been reorganized into three operators which together operate around 20 helicopters. Many of these helicopters are now aging, with some over 35 years old. As a result, there will be pressure to bring in newer generation, reliable aircraft in the years ahead to ensure better patient outcomes.

In contrast, many Southeast Asian counties do not have a dedicated HEMS service, although EMS helicopters are available on an ad hoc, case-by-case basis. A dedicated HEMS infrastructure is likely to develop in the future as these countries experience increased prosperity and a growing middle class. The HEMS market in China experienced a rapid start with many helicopters entering the market in a short space of time. The initial surge was not sustainable however, and this has resulted in many of these helicopters exiting the market or being grounded.

Overall, however, LCI expects demand for HEMS in China to continue to rise and, in the years ahead, envisages this will increasingly be met by state-backed institutions as opposed to private operators.

As with China, in India there is a huge potential for helicopters to service the country's hospital network, and it is only a matter of time before both these countries develop a dedicated HEMS network. As of now however, the HEMS market in India is underdeveloped, despite the efforts of several start-up operations over the past few years.

OFFSHORE ENERGY

There is a growing demand for offshore helicopters in the region, as new projects come on stream and oil prices return to the levels last seen seven to eight years ago. However, the often restrictive age requirements set by either the local aviation authorities or the oil companies are limiting the availability of suitable helicopters. This, combined with headwinds in the finance markets in this sector, has led to a shortage of supply, which if left unchecked could lead to production bottlenecks in the future.

LCI is already actively supporting several offshore oil and gas operators, and in Asia-Pacific, helicopters are mainly supporting

large natural gas production, for example in Australia and Malaysia. Natural gas is an important transition energy source as it is being used in North Asia to replace coal in electricity production.

The offshore wind sector is the fastest growing sector in the energy market and there is great potential in Asia. There are several large projects underway in Taiwan which will require helicopter support, as there are in China and in Japan. LCI's VP Marketing for Asia, Christopher Lloyd explains:

> ***Currently the Chinese and Japanese offshore wind turbines are being serviced by vessels, but as the fields grow and expand further offshore, inevitably there will be a demand for helicopter support as we have seen in Europe where helicopters are recognized as safer, faster and having a lower carbon footprint compared with Crew Transfer Vessels (CTV).***

Offshore wind support is an area that LCI has been involved with for many years, and we welcome the opportunity to work with operators in Asia as this market grows."

PARAPUBLIC

The Parapublic sector is an area that is already well-developed in many countries in Asia, and includes police, coastguard and SAR services. Whilst it is often delivered directly by government agencies, this is an area in which private operators are increasingly offering their services to the government agencies, especially in markets such as Australia, Malaysia and China. With its expertise in these sectors in several markets outside Asia, LCI looks forward to bringing these skills to Asia to help accelerate these highly effective private – public sector partnerships.

LCI's CEO, Jaspal Jandu, concludes:

> ***These are just a few of the areas of growth we see developing in Asia. In 2022, LCI will continue to invest in its presence and partnerships and is very much open for business in this region.***

LCI

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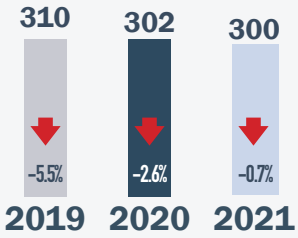
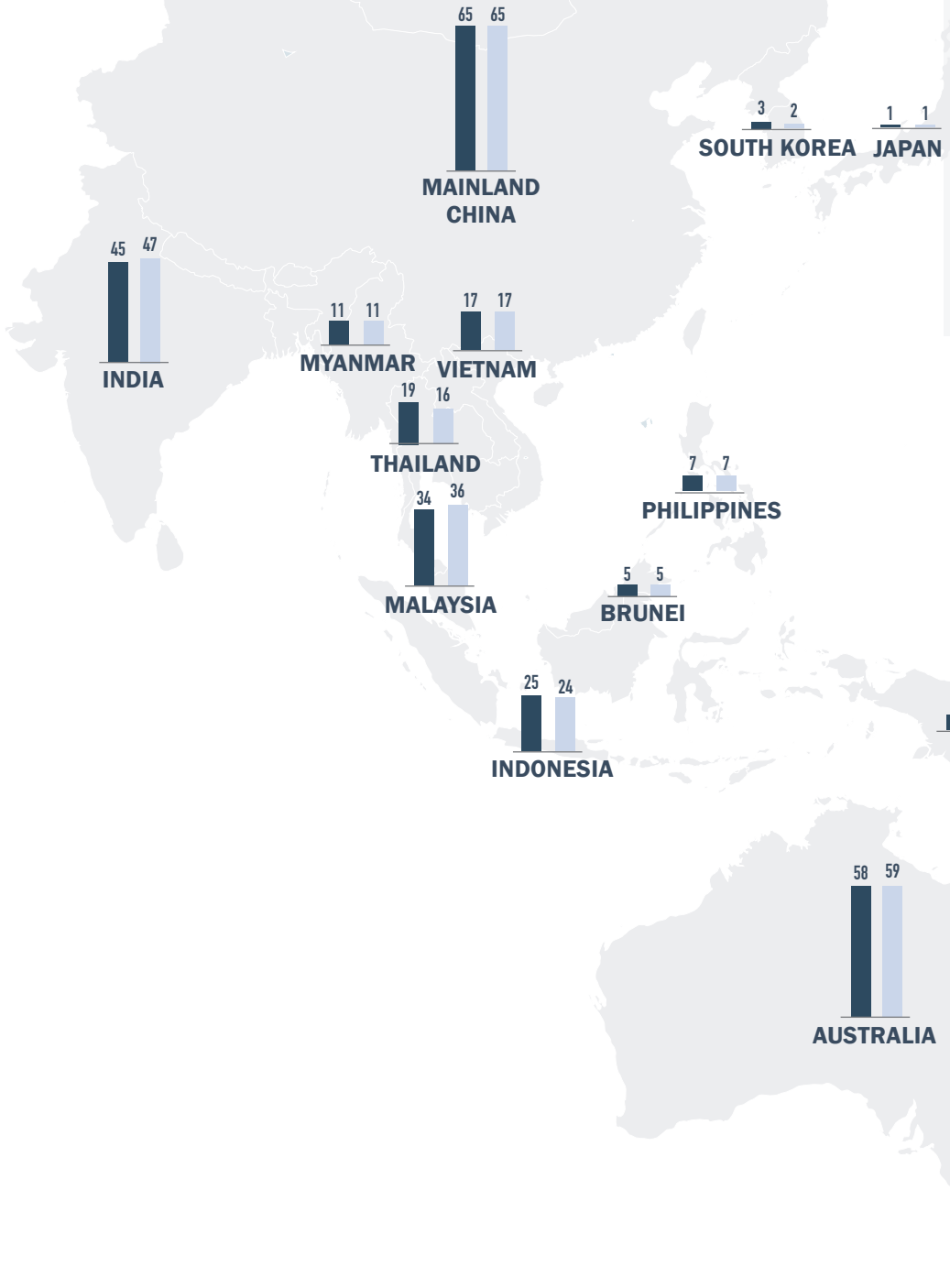
MARKET UPDATE:
OFFSHORE MARKET



OFFSHORE FLEET BY COUNTRY



LARGEST MARKET
65
MAINLAND CHINA

MOST FLEET NET ADDITIONS
+2
INDIA

MOST FLEET NET DEDUCTIONS
-3
THAILAND

Image courtesy of Leonardo

THERE WERE A TOTAL OF 300 CIVIL TURBINE HELICOPTERS DEVOTED TO OFFSHORE OPERATIONS IN ASIA-PACFIC AT THE END OF 2021. THE OFFSHORE FLEET DECREASED BY TWO UNITS (A DROP OF 0.7%) COMPARED TO 2020. BY NUMBERS THE OFFSHORE FLEET IS AROUND 6.7% OF THE TOTAL CIVIL TRUBINE HELICOPTER UNITS, YET IT IS AROUND 16% OF ITS TOTAL VALUE.

OFFSHORE FLEET REGIONAL DISTRIBUTION

Country/Region	Fleet Size (Units)	Replacement Cost (Million USD)
MAINLAND CHINA	65	1,401
AUSTRALIA	59	1,016
INDIA	47	631
MALAYSIA	36	637
INDONESIA	24	336
VIETNAM	17	319
THAILAND	16	276
MYANMAR	11	163
PHILIPPINES	7	73
PNG	6	63
BRUNEI	5	129
NEW ZEALAND	4	51
SOUTH KOREA	2	29
JAPAN	1	12
TOTAL	**300**	**$5,134**

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 2021 list price.

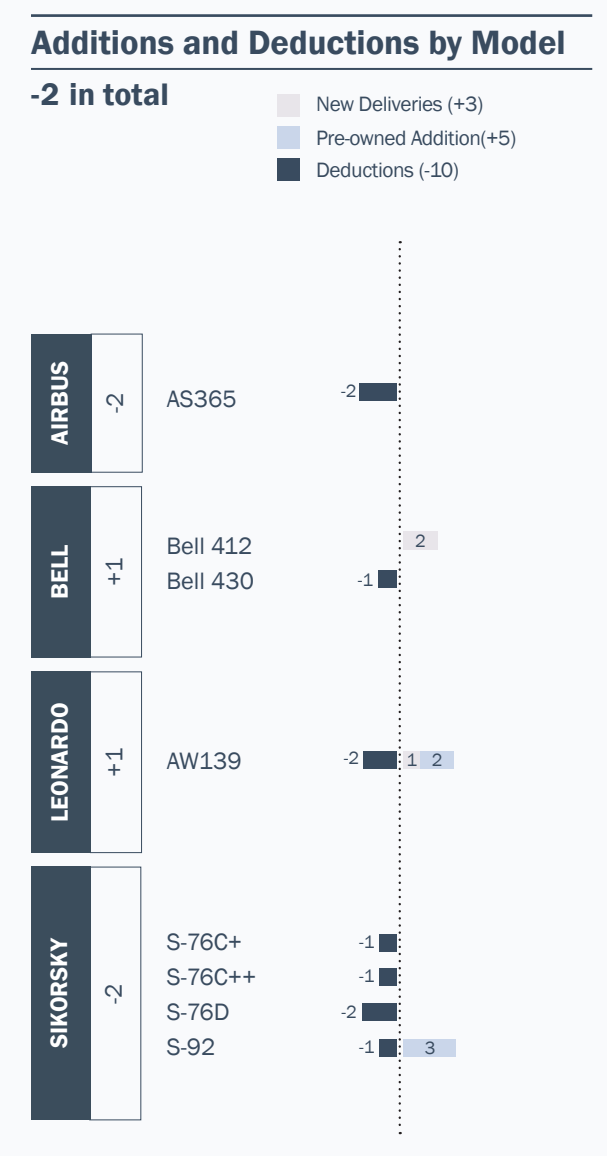
Although the global economy started to recover from the downturn brought on by the COVID-19 pandemic, the O&G industry recovery has been hampered by the decline of petroleum supplies and capital.

Prices for oil and gas were skyrocketing as demand rose faster than supply. The insufficient supply can be partly attributed to OPEC+ (Organization of the Petroleum Exporting Countries) crude oil production cuts that began in late 2020. As a result of the production cuts, the price of crude oil started 2021 at US$48.52 per barrel and increased to a five year high of US$83.36 on October 26.

Countries around the world are experiencing various levels of an energy crisis. As the principles of Environmental, Social, and Corporate Governance (ESG) oppose the use of fossil fuels, many institutional investors and governments have begun to eliminate non-renewable resources from their alternative portfolios. Jim Cramer, the CNBC investment expert, once claimed that oil stocks are non-investable. This has shaken

investors and led them to withdraw funds from the crude oil industry. Because of the unfavorable conditions in the O&G industry, the offshore market for helicopters in the Asia-Pacific region continued to shrink in 2021. However, the rate of decline slowed, as the demand for oil and gas has recovered to pre-pandemic levels.

The offshore configured helicopter fleet in Asia-pacific has three types of missions, namely, O&G, Marine Pilot Transfer and Wind Farm. Accounting for 280 offshore helicopters, the majority of the offshore helicopters flew O&G missions. Under these missions, the decrease of four helicopters (a 1.4% decrease) from 2020 to 2021 was much smaller than the difference between 2019 and 2020 of 18 helicopters. The number of offshore helicopters flying Marine Pilot Transfer missions remained at 18 helicopters. Two helicopters flew Wind Farm missions, both operated by China Southern Airlines General Aviation.



The three new deliveries, five pre-owned additions, nine deductions, and the one helicopter that changed its mission from offshore to onshore in the offshore helicopters category led to two net deductions in 2021.

Airbus and Leonardo supplied 107 (35%) and 87 helicopters (29%) of the current offshore fleet, respectively, and continued to be the top two OEMs. Sikorsky came third, with a fleet of 77 helicopters (26%), followed by Bell with 24 helicopters (8%).

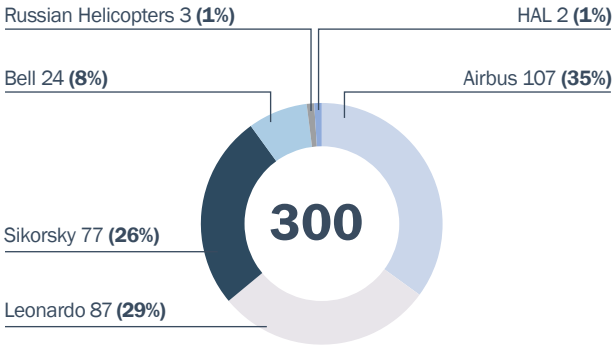
The Leonardo AW139 helicopter model was the single most used offshore helicopter model in the Asia-Pacific region, as there were 68 of them in the offshore fleet in 2021. The Sikorsky S-92 and Airbus AS365 were the second and third most popular offshore models, with 33 and 30 helicopters, respectively.

Mainland China and Australia are the biggest offshore markets. Although India saw a two-unit net addition, there was no change in its rank. Thailand accounted for the most offshore fleet deductions of three units in 2021, which saw it drop from sixth to seventh place, with Vietnam overtaking it.

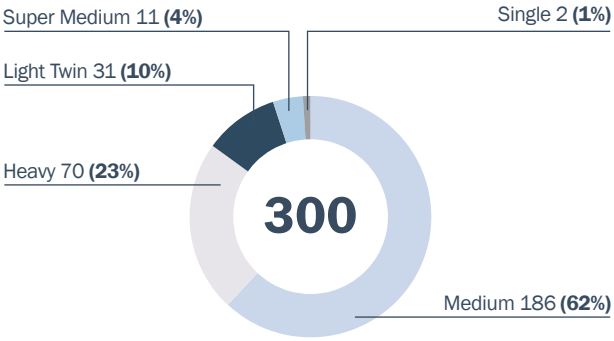
Citic Offshore Helicopter Co. (COHC), the largest Asia-Pacific offshore operator with 40 offshore helicopters in 2020, saw a decrease of one unit in its offshore fleet, but retained its top position in 2021. Weststar Aviation ranked second and added one helicopter to its fleet in 2021. India-based Pawan Hans, which added one helicopter to its fleet, had 18 helicopters at the end of 2021 and ranked third in terms of fleet size.

The O&G industry is currently going through a cycle of under-investment. Although renewable energy is growing, and capital is flowing from non-renewable resources to the development of renewable ones, the production of renewable resources is not sufficient to fill in the gap arising from the low energy supply. It should also be stated that renewable energy cannot widely replace fossil fuel usage at this current time. The demand for crude oil remains high and continues to drive prices up. In late 2021, Bernstein Senior Oil and Gas Analyst Neil Beveridge said US$150 per barrel of oil is a possibility in 2023 or 2024. Unless there is a dramatic decline in crude oil demand, which is unlikely, the need for offshore operations will remain. Thus, under the pressure of various external factors, offshore operators will remain cautious, leading to further slight reductions in the Asia-Pacific offshore fleet with a slow rebound in the industry.

OFFSHORE FLEET BY OEM



OFFSHORE FLEET BY SIZE CATEGORY



OFFSHORE FLEET BY OPERATOR (5 OR MORE HELICOPTERS)

5 Helicopters

39	COHC	9	Heli-Union
22	Weststar	8	CHC
18	Pawan Hans	8	Aviator Group
17	VNH	8	Travira
16	China Southern GA	8	Pelita
15	PHI	7	China GA
15	Global Vectra	6	SFS
13	MHS	5	Esso
11	Babcock	5	UOA
9	Heligo	5	Shell Brunei

OFFSHORE FLEET BY MODEL AND COUNTRY/REGION

		MAINLAND CHINA	AUSTRALIA	INDIA	MALAYSIA	INDONESIA	VIETNAM	THAILAND	MYANMAR	PHILIPPINES	PNG	BRUNEI	NEW ZEALAND	SOUTH KOREA	JAPAN	TOTAL
AIRBUS	AS332L	1														**1**
	AS332L1	6														**6**
	AS332L2				3		3									**6**
	AS355				1					2						**3**
	AS365	2	2	20		3			2	1						**30**
	BK117		1			1					3		1			**6**
	H125		2													**2**
	H135		6							1						**7**
	H145		2							1	1		1			**5**
	H155	14					4									**18**
	H175		2													**2**
	H225	12			5		4									**21**
BELL	Bell 212										2					**2**
	Bell 214		1													**1**
	Bell 412			16		4									1	**21**
HAL	Dhruv			2												**2**
LEONARDO	AW109	2	8													**10**
	AW139	2	18	8	16	6		8	4	2		2	2			**68**
	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						1		**6**
	S-76C++	11			3	9		1	4							**28**
	S-76D			1				2								**3**
	S-92	13	15					2				3				**33**
	Total	**65**	**59**	**47**	**36**	**24**	**17**	**16**	**11**	**7**	**6**	**5**	**4**	**2**	**1**	**300**

COUNTRY PROFILES

IN-DEPTH ANALYSIS AND DATA

ON MAJOR ASIA-PACIFIC CIVIL HELICOPTER MARKETS

1. HISTORICAL DATA ON FLEET SIZE & GROWTH
2. BREAKDOWN OF FLEET BY OEM, SIZE CATEGORY & REGISTRATION
3. OPERATIONAL CHALLENGES & AUTHORIZATIONS FOR AIRWORTHINESS
4. OPERATOR ANALYSIS: GROWTH DECLINE & FLEET MAKEUP
5. DELIVERIES & DEDUCTIONS BY MODEL

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BRISTOW'S EVTOL AMBITIONS

By Icy Ho

Bristow Group provides three major services including government services, commercial airline, and offshore energy transportation. Whilst government services remain stable from the effect of COVID-19, commercial airline and energy services have been significantly affected by travel restrictions and the downturn in oil, which has caused delays in signing contracts.

Despite a tough 2021, the Bristow Group remains optimistic for multi-year growth in energy services, which Chris Bradshaw, the company's CEO, says will likely begin towards the end of 2022 and continue for the next few years. However, Bradshaw also believes that the pace of recovery will vary by region, especially in the Western hemisphere, with countries including Brazil, the Caribbean triangle, and the United States all showing signs of recovery. However this is likely to peak after 2030, by which point the aviation industry is expected to be less reliant on fossil-based fuels.

Bristow Projects

For now, energy services remain the largest in the percentage of revenue. However, Government Services is also a global leading business for the company, which mainly provides search and rescue service and transport. The company also provides some leasing and third-party maintenance, repair, and overhaul (MRO) services.

Being the launch customer of the AW609, the company is collaborating with Leonardo and the Federal Aviation Administration (FAA) on the certification, as well as providing training and maintenance programs for the aircraft. Both Bristow and Leonardo see the necessity of demonstrating the operating abilities of the brand-new tiltrotor VTOL aircraft. Aside from offshore services, both companies also believe the aircraft will be more suitable for long-range Air Medivac and VIP missions with its additional convenience and time-saving characteristics that can be applied without requiring additional infrastructure. As a "Special Class Aircraft" classified by the FAA, the aircraft is expected to require at least one year to be certified to fly.

eVTOLs in Bristow

Bristow ordered 150 eVTOLs in 2021 and has partnered up with manufacturers such as Vertical Aerospace and Electro. Aero, with more collaborations on the way. Bristow believes eVTOLs will allow it to reach more potential markets with the eVTOL's ability to transfer payload to confined areas. With the forecast of eVTOL aircraft arriving between 2025 and 2027, the company has expressed confidence in supporting commercial operations as much as it can and has already developed various new business models for providing cargo and regional services.

Additionally, reducing its carbon footprint is another focus when utilizing eVTOLs for Bristow. Action has been taken to increase the company's sustainability by providing SAF options, electrifying ground support equipment, and managing facility and staff transportation. The company is seeing a gradual evolution in power sources, making electric aircraft fly greener with longer range.

Dave Stepanek, the company's Executive VP, Sales and Chief Transformation Officer, says that to get public acceptance, innovators must take a slow and steady approach with eVTOLs at first. Bristow will assist with a steady business to business approach regionally with short supply chains and back up aircraft. It is believed that a gradual approach should be taken to show the safety and reliance eVTOLs have to potential users and regulators.

With more than 200 helicopters in its fleet, Bristow currently has no intention of replacing its helicopter fleet with eVTOLs in the near the future. When asked to estimate when helicopter manufacturers stop manufacturing traditional helicopters, the company believes the determining factor will be on cost and energy transition between helicopters and eVTOLs. As Stepanek states, "The beauty of eVTOLs is that they are less complex with less moving parts leading to lower operating costs."

Future Forecast

In the upcoming ten years, Bristow expects to be able to reach a market that will be able to provide services to customers with different approaches. In the future, there will be other forms of delivery logistics with just in time and just in case inventory. The company is also determined to innovate with different market approaches and promises to continue its excellent services within its energy business and government sectors.

Although air taxis are not currently in the plan, the company is interested in supporting OEMs that are interested in air taxis with Air Operator Certificates (AOC), and MRO services.

eVTOL Specifications

When asked if eVTOLs would replace helicopters, Stepanek remarked that eVTOLs need to have a range of over 400 nautical miles. Moreover, these eVTOLs will also need to carry between 12-19 passengers, because the energy sector requires a certain payload that an aircraft needs to carry. In addition, the aircraft will need to give regulators confidence when it comes to certifying them flying long range over water.

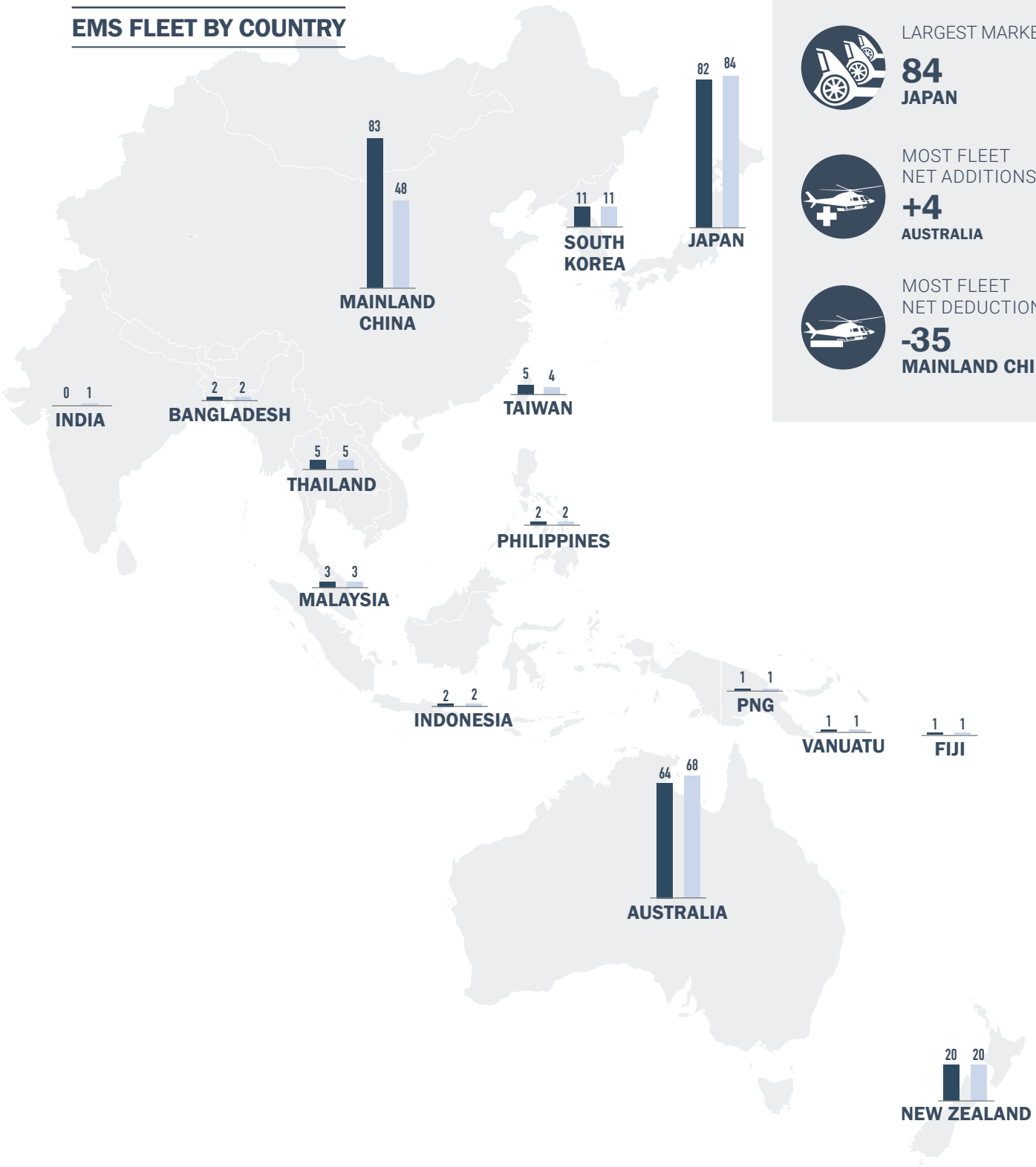
Compared with a S92 helicopter, an eVTOL with the range of 400 nautical miles may require wings which will cost additional infrastructure as most offshore facilities are designed for helicopters. Stepanek pointed out the potential of some short-range helicopter replacement, but Bristow is not expecting to see an offshore eVTOL in the near future. As he puts it, "To replace medium and heavy helicopters in the energy business will take a long time, roughly by 2040."

Chris Bradshaw
Chief Executive Officer
Bristow
www.bristowgroup.com

David Stepanek
Executive VP, Sales and
Chief Transformation Officer
Bristow
www.bristowgroup.com

MARKET UPDATE:
EMS MARKET

EMS FLEET BY COUNTRY



279 (4.1%) 2019
282 (1.1%) 2020
253 (-10.3%) 2021

LARGEST MARKET
84
JAPAN

MOST FLEET NET ADDITIONS
+4
AUSTRALIA

MOST FLEET NET DEDUCTIONS
-35
MAINLAND CHINA

Image courtesy of Leonardo

AT THE END OF DECEMBER 2021 THERE WERE 253 OPERATIONAL EMS HELICOPTERS IN THE ASIA-PACIFIC REGION. THE EMS FLEET DECREASED BY 29 UNITS COMPARED TO 2020. THIS CHANGE CAN BE ATTRIBUTED TO 47 DEDUCTIONS, TEN PRE-OWNED ADDITIONS, SIX NEW DELIVERIES, AND TWO HELICOPTERS THAT CHANGED THEIR CONFIGURATIONS. EMS CONFIGURED HELICOPTERS REPRESENT 5.7% OF THE TOTAL FLEET AND 7% OF THE TOTAL FLEET VALUE. ALTHOUGH THE GROWTH RATE HAS SLOWED DOWN SINCE 2019, THE REGISTERED EMS MARKET GREW FOR FIVE CONSECUTIVE YEARS AND SAW A DECLINE FOR THE FIRST TIME IN 2021 (A DROP OF ABOUT 10.3%), WHICH IS DUE TO A MAJOR DECLINE IN THE MAINLAND CHINA FLEET.

EMS FLEET REGIONAL DISTRIBUTION

Country/Region	Fleet Size (Units)	Replacement Cost (Million USD)
JAPAN	84	650
AUSTRALIA	68	863
MAINLAND CHINA	48	270
NEW ZEALAND	20	209
SOUTH KOREA	11	121
THAILAND	5	42
TAIWAN	4	47
MALAYSIA	3	17
PHILIPPINES	2	17
INDONESIA	2	14
BANGLADESH	2	7
VANUATU	1	6
INDIA	1	9
PNG	1	6
FIJI	1	8
TOTAL	**253**	**$2,287**

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 2021 list prices.

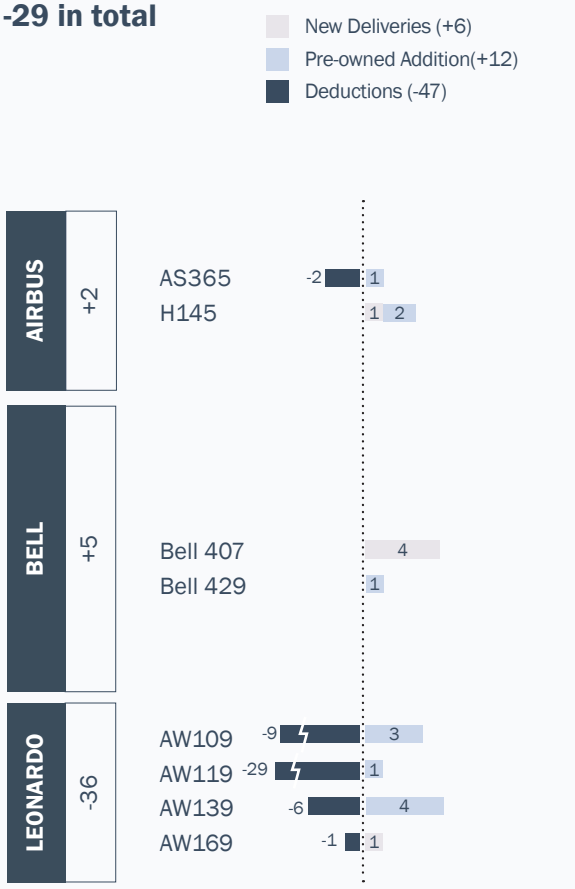
EMS is indispensable to the medical service sector as it provides urgent pre-hospital treatment for serious injuries and illnesses. EMS helicopters not only offer some of the most advanced pre-hospital care available, but they can also quickly access rural or remote locations and intervene when ground-based medical units are not available. Since EMS helicopters need to perform different rescue tasks, the ease of converting equipment in the cockpit is critical for providing medical services.

The first documented EMS helicopters in Asia-Pacific appeared during the Korean War for transferring the injured. Today, EMS helicopters have expanded beyond military use under various scenarios, including accidents and natural disasters. When incident locations hamper the process of retrieving patients, EMS helicopters might also be responsible for air-dropping equipment, medicine, and food.

In 2021, Japan led the market with 84 EMS helicopters, two more than in 2020. The Japanese Congress enacted the EMS helicopters operation procedures, ensuring governments and medical centers ran smoothly under different incidents. Since earthquakes happen in Japan frequently, the EMS sector is

Additions and Deductions by Model

-29 in total



critical to the country. Taking Osaka for example, the Osaka air medical service team was formed in 1970 as it was responsible for emergency transportation and rescue.

Australia surpassed mainland China as the second-largest EMS market in APAC, with a fleet of 68 helicopters dedicated to EMS operations. Due to its unique landform, helicopters would be a better option when performing cliff and sea rescues. In Australia, helicopter-based EMS is funded by the government and the community.

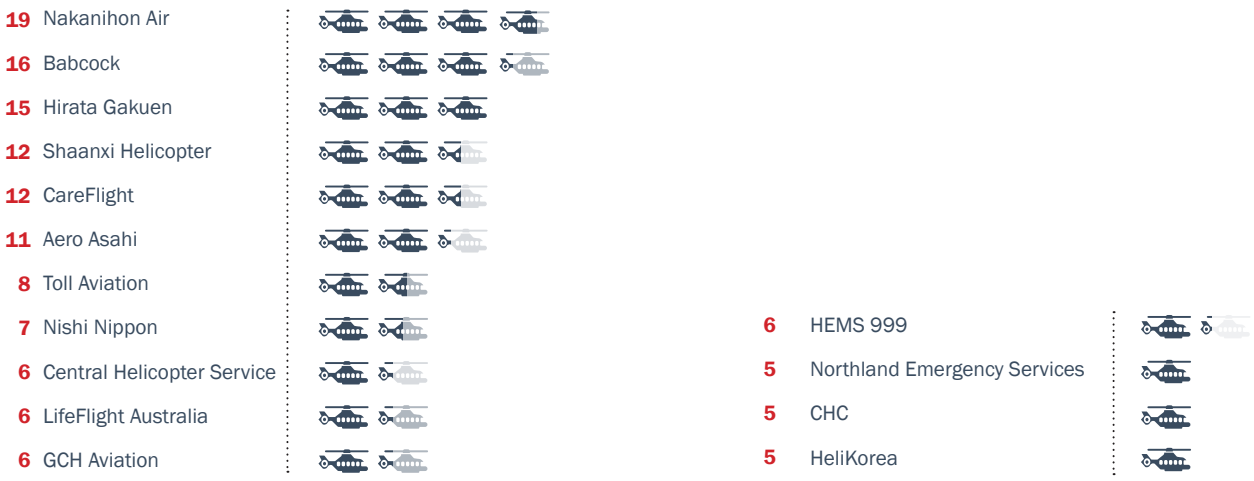
With a net deduction of 35 helicopters, mainland China is now ranked third with 48 EMS helicopters in 2021. Most of the deducted EMS helicopters were operated under the name of Kingwing, which declared bankruptcy in 2021 and subsequently put its EMS configured helicopters into storage. In fact, there were early signs that there could be recession in the Chinese EMS market. In 2020, at least 38 helicopters were grounded or stored (Kingwing grounded at least 29 helicopters), taking 47% of the total EMS capacity out of the market. However, despite the absence of such a powerful operator, mainland China still accounted for about 19% of the EMS market share.

Japan, Australia and Mainland China contributed to 79% of helicopters in the EMS market in the Asia-Pacific region.

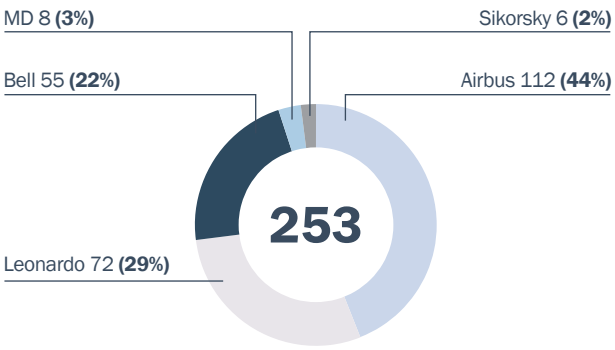
The Airbus H135 remained the top EMS helicopter model with 42 units in the Asia-Pacific region in 2021, accounting for 17% of the total EMS fleet. Japan has the highest concentration of EMS H135s, with 34 operating in the country. Leonardo's AW139 was the second most popular with 36 units (14% market share).

EMS FLEET BY OPERATOR (5 OR MORE HELICOPTERS)

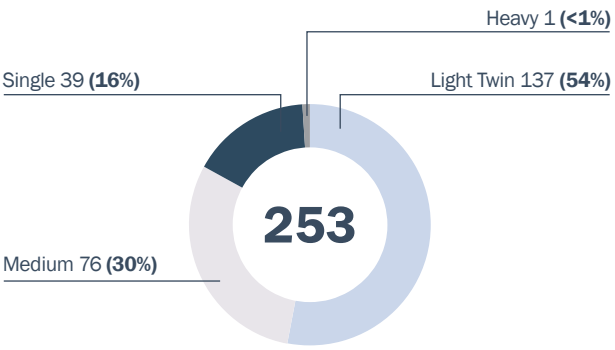
5 Helicopters



EMS FLEET BY OEM



EMS FLEET BY SIZE CATEGORY



EMS FLEET BY MODEL AND COUNTRY/REGION

		JAPAN	AUSTRALIA	MAINLAND CHINA	NEW ZEALAND	SOUTH KOREA	THAILAND	TAIWAN	MALAYSIA	PHILIPPINES	INDONESIA	BANGLADESH	VANUATU	INDIA	PNG	FIJI	TOTAL
AIRBUS	AS365	1						2									**3**
	BK117	7	6		10												**23**
	B0105								3				1		1		**5**
	H125		1	1	1												**3**
	H130			6								2					**8**
	H135	34		8													**42**
	H145	19	4		1		2										**26**
	H155					1											**1**
	H225					1											**1**
BELL	Bell 206		2							1	1						**4**
	Bell 222				1												**1**
	Bell 407			20													**20**
	Bell 412		20								1						**21**
	Bell 429	5		1			3										**9**
LEONARDO	AW109	12		7		5										1	**25**
	AW119			2													**2**
	AW139		33	3													**36**
	AW169				2	4		2						1			**9**
MD	MD 500		2														**2**
	MD 900	6															**6**
SIKORSKY	S-76A				3					1							**4**
	S-76C++				2												**2**
	Total	**84**	**68**	**48**	**20**	**11**	**5**	**4**	**3**	**2**	**2**	**2**	**1**	**1**	**1**	**1**	**253**

HELICOPTER OEM OVERVIEW

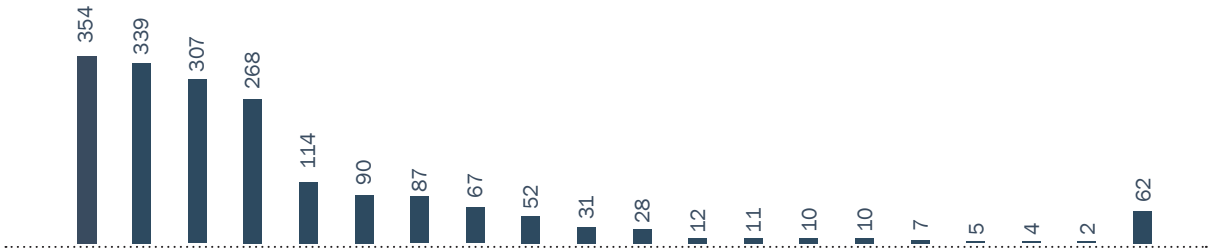
AIRBUS

RANKING **No.1**

GROWTH **+21 ▲ 1.1% ▲**

MOST POPULAR **H125**

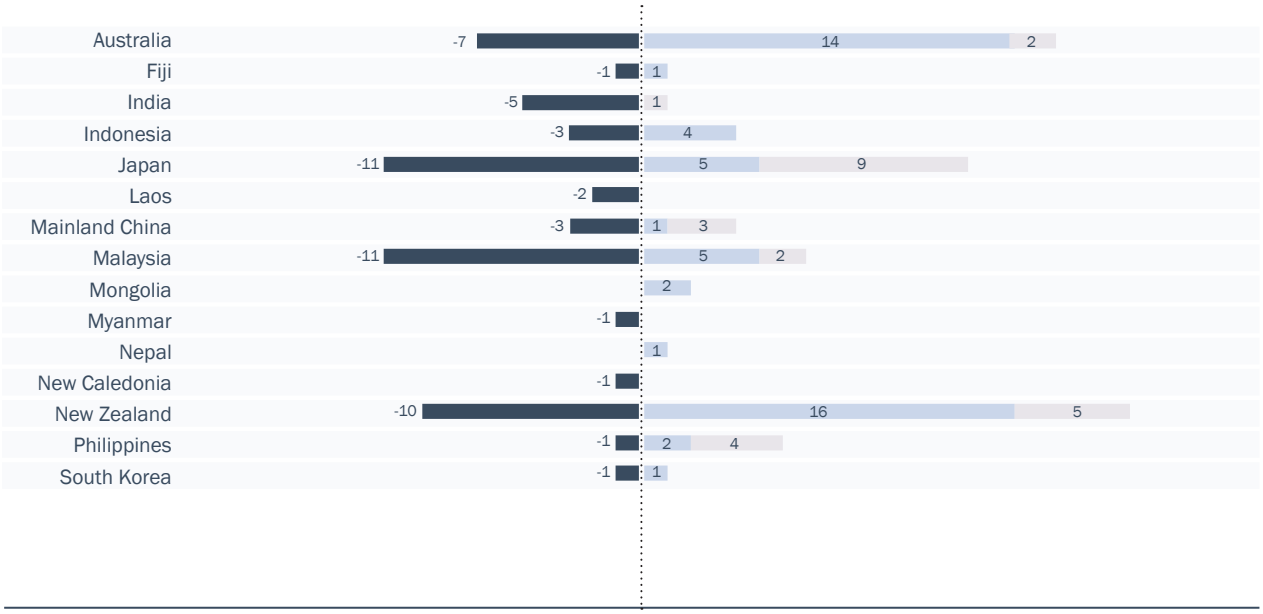
LARGEST FLEET **Japan**



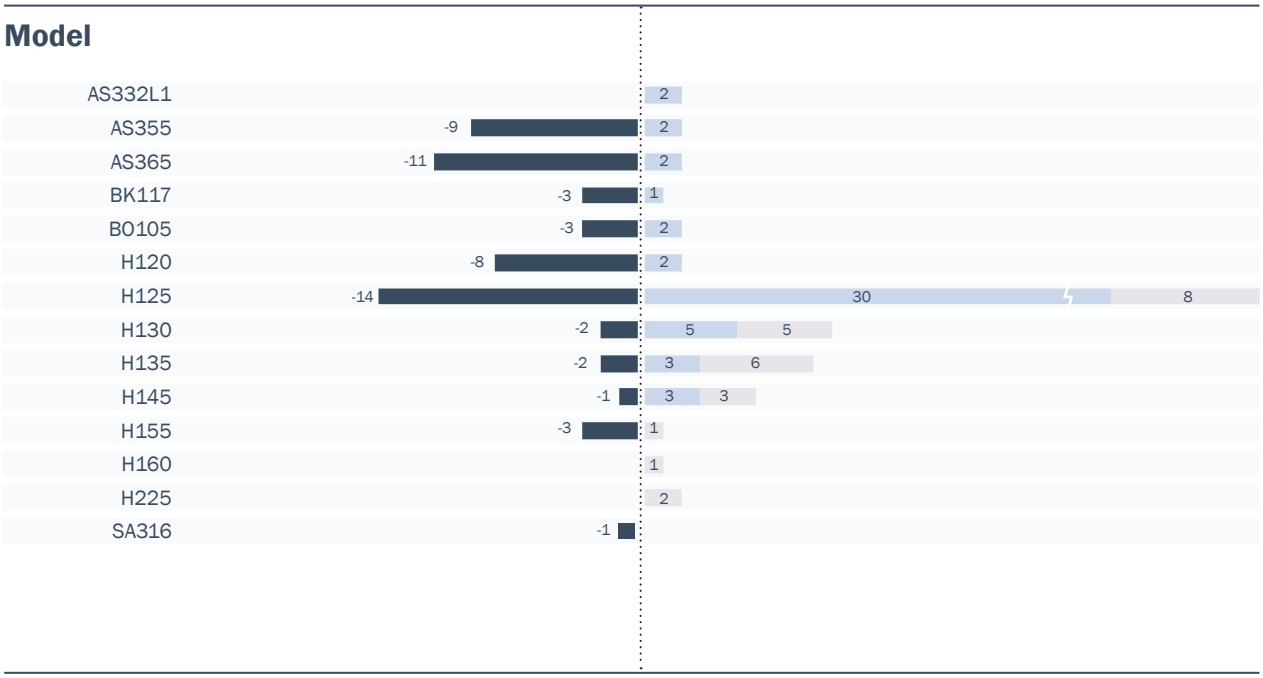
	JAPAN	AUSTRALIA	NEW ZEALAND	MAINLAND CHINA	INDIA	PHILIPPINES	INDONESIA	MALAYSIA	SOUTH KOREA	PNG	THAILAND	CAMBODIA	VIETNAM	TAIWAN	HONG KONG SAR	MYANMAR	SRI LANKA	BANGLADESH	LAOS	OTHERS	TOTAL
H125	87	178	183	132	21	37	18	7	17	9	7	5				4	2		2	44	753
H135	81	19		37	5	4	4	8	1		3	1			1					3	167
AS365	50	9		3	39	4	10	5	11		2	1		8		2				1	145
H130	9	33	36	14	6	23	7				3	2					2	4		5	144
BK117	26	28	39				4		9	11				2							119
AS355	22	20	14		4	7		18	1			1								3	90
H145	38	9	8	3	6	6	5		1	4	4	1								3	88
B0105	1	12	6			3	29	8	5	6										3	73
H120	4	24	18	14	1			8								1	1				71
H225	14	1		32				5	5			1	4								62
H155	6	1		22	1	3	4	5	2		7		4		2						57
SA316					24																24
AS332L1	11	1		8			2														22
H175		2									2				7						11
SA315			1		3		3			1											8
AS332L	3		2	2																	7
AS332L2	1							3					3								7
SA319					4																4
H215				1			1														2
SA341		1				1															2
SA313						2															2
H160	1																				1
MBB B0 105		1																			1
Total	**354**	**339**	**307**	**268**	**114**	**90**	**87**	**67**	**52**	**31**	**28**	**12**	**11**	**10**	**10**	**7**	**5**	**4**	**2**	**62**	**1,860**

ADDITIONS AND DEDUCTIONS (AIRBUS)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

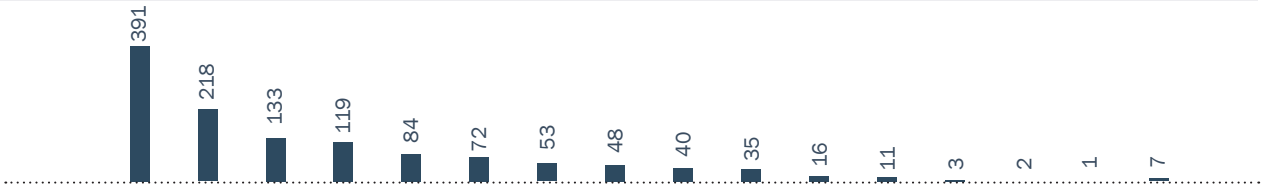
BELL

RANKING **No.2**

GROWTH **39 ▲ 3.3% ▲**

MOST POPULAR **Bell 206**

LARGEST FLEET **Australia**

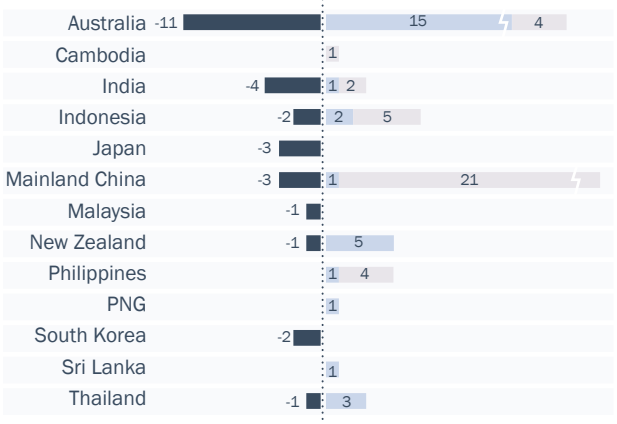


	AUSTRALIA	MAINLAND CHINA	JAPAN	NEW ZEALAND	INDIA	INDONESIA	THAILAND	PNG	PHILIPPINES	SOUTH KOREA	MALAYSIA	BANGLADESH	CAMBODIA	VIETNAM	SRI LANKA	OTHERS	TOTAL
Bell 206	255	42	26	97	17	16	8	9	17	19	11				1	2	520
Bell 407	12	120	7		24	12	3	17	4	2	2	6				3	212
Bell 412	41	7	49		27	27	20	3	1	4							179
Bell 429	9	18	7	7	9	8	10		8		1	2	1				80
Bell 505	10	28	20	4	1	3			7		1		2	2			78
Bell 212	14	2			1	4	8	16								2	47
Bell 205	19		1	7			4			1							32
Bell 430			12		1			1	2	2		2					20
Bell 427	4	1	6	2	2	2			1								18
Bell 214	12							1		5							18
Bell 204	5		5	1													11
Bell 222	4			1				1			1						7
Bell 230	1				2					1		1					5
Bell 214ST	2									1							3
Bell 209	2																2
Bell OH-58	1																1
Total	**391**	**218**	**133**	**119**	**84**	**72**	**53**	**48**	**40**	**35**	**16**	**11**	**3**	**2**	**1**	**7**	**1,233**

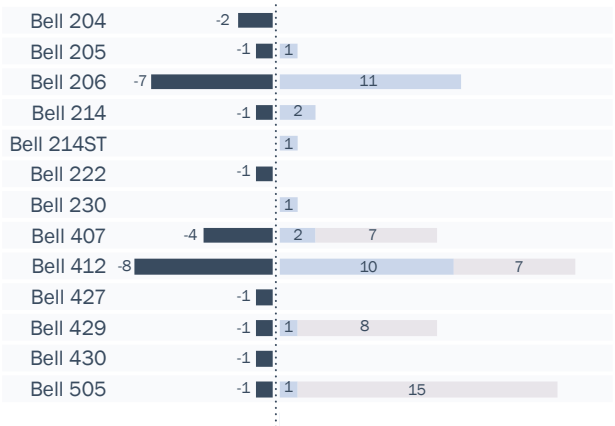
ADDITIONS AND DEDUCTIONS

New Deliveries (+37) | Pre-owned (+30) | Deductions (-28)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

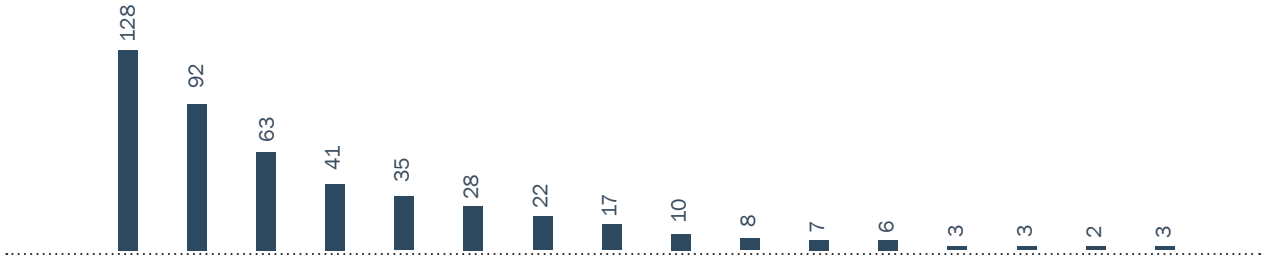
LEONARDO

RANKING **No.3**

GROWTH **-15 -3.1%**

MOST POPULAR **AW139**

LARGEST FLEET **Japan**

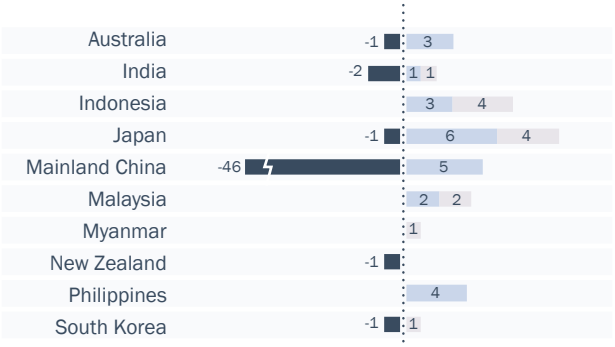


	JAPAN	AUSTRALIA	MAINLAND CHINA	INDIA	MALAYSIA	SOUTH KOREA	INDONESIA	PHILIPPINES	NEW ZEALAND	THAILAND	MYANMAR	MACAO SAR	VIETNAM	BANGLADESH	TAIWAN	OTHERS	TOTAL
AW139	64	64	26	11	26	13	8	7	2	8	7	6				2	244
AW109	58	23	22	23	3	7	3	6	3					1		1	150
AW119	1	3	9	4		1	4	3	1					2			28
AW169	4		1	3		5	6	1	2						2		24
AW189	1	2			6	1	1						3				14
SW-4			5			1											6
AH.1									2								2
Total	**128**	**92**	**63**	**41**	**35**	**28**	**22**	**17**	**10**	**8**	**7**	**6**	**3**	**3**	**2**	**3**	**468**

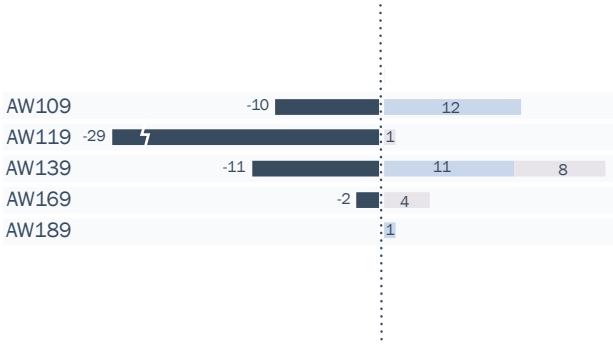
ADDITIONS AND DEDUCTIONS

New Deliveries (+13) Pre-owned (+24) Deductions (-52)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

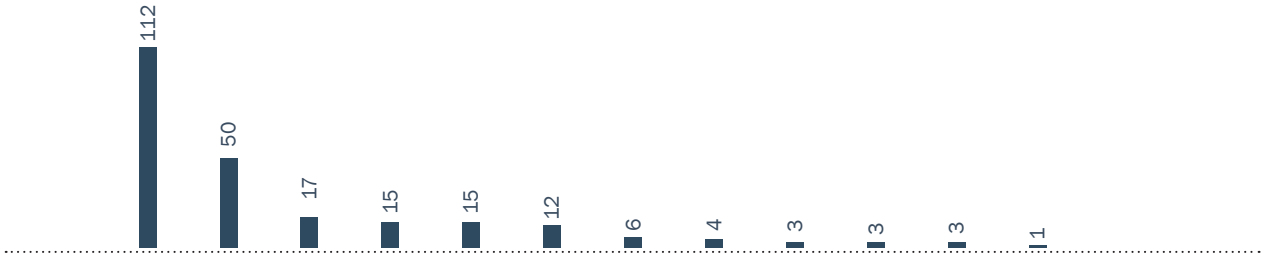
MD

RANKING **No.4**

GROWTH **0 0%**

MOST POPULAR **MD 500**

LARGEST FLEET **New Zealand**

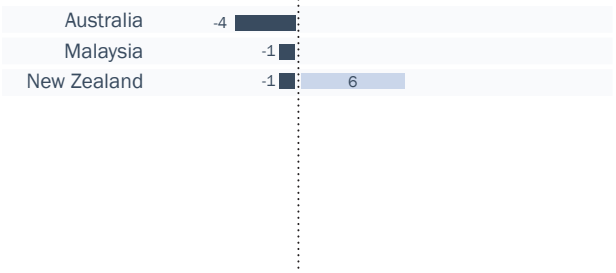


	NEW ZEALAND	VANUATU	AUSTRALIA	GUAM	JAPAN	PHILIPPINES	HONG KONG SAR	SOUTH KOREA	INDONESIA	MAINLAND CHINA	INDIA	NEW CALEDONIA	TOTAL
MD 500	80	50	14	15	3	7	1	3	3			1	**177**
MD 520	21		1				1	1		1	1		**26**
MD 900	1				11	3	4			1	2		**22**
MD 600	5		1		1	2				1			**10**
MD 530	5		1										**6**
Total	**112**	**50**	**17**	**15**	**15**	**12**	**6**	**4**	**3**	**3**	**3**	**1**	**241**

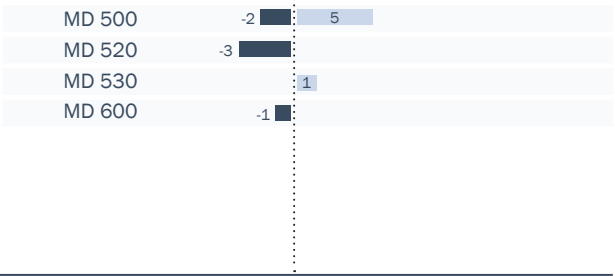
ADDITIONS AND DEDUCTIONS

New Deliveries (-) Pre-owned (+6) Deductions (-6)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

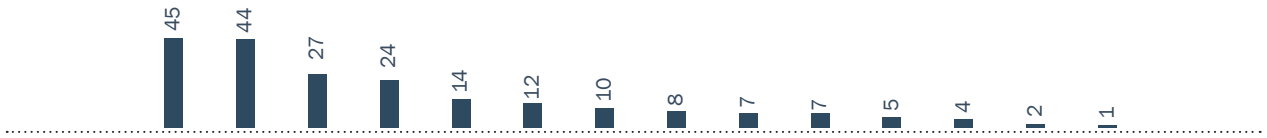
SIKORSKY

RANKING **No.5**

GROWTH **-4 -1.9%**

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

LARGEST FLEET **South Korea**

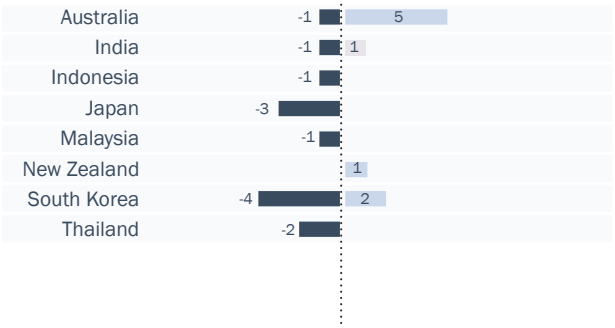


	SOUTH KOREA	MAINLAND CHINA	JAPAN	AUSTRALIA	TAIWAN	INDONESIA	MALAYSIA	THAILAND	NEW ZEALAND	INDIA	MYANMAR	BRUNEI	PHILIPPINES	PNG	TOTAL
S-76C++	2	16	4			9	4	1	3	4	4				47
S-92	2	13		15				2				3			35
S-76D	3	8	15					2		2					30
S-76C+	7	6	4	1		1	1	3							23
UH-60				2	14				1						17
S-76A	2		1	1		1			3				1	1	10
S-61	9					1									10
S-76C	1		2				4				1				8
S-76B	5			2			1								8
S-64	6														6
S-76A+	3			2											5
S-76A++	5														5
S-330				1						1			1		3
S-333		1	1												2
S-70A												1			1
Total	**45**	**44**	**27**	**24**	**14**	**12**	**10**	**8**	**7**	**7**	**5**	**4**	**2**	**1**	**210**

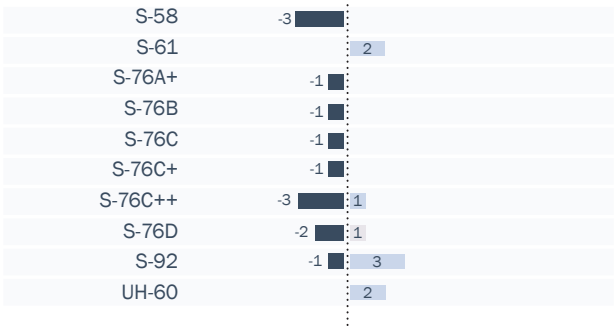
ADDITIONS AND DEDUCTIONS

New Deliveries (+1) | Pre-owned (+8) | Deductions (-13)

Country/Region



Model



Note: Excludes movements between countries/regions in APAC.

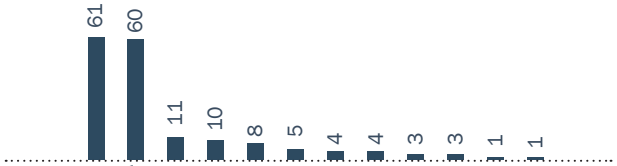
RUSSIAN HELICOPTERS

RANKING **No.6**

MOST POPULAR **KA-32**

GROWTH **4 ▲ 2.4% ▲**

LARGEST FLEET **South Korea**



	SOUTH KOREA	MAINLAND CHINA	VIETNAM	INDONESIA	INDIA	PNG	NEPAL	MONGOLIA	THAILAND	SRI LANKA	LAOS	JAPAN	TOTAL
KA-32	50	21		2					3			1	77
Mi-8	3	3	6	2	7	5	4	4		3	1		38
Mi-171		32	3		1								36
Mi-2	8			6									14
Mi-26		4											4
Mi-17			2										2
Total	**61**	**60**	**11**	**10**	**8**	**5**	**4**	**4**	**3**	**3**	**1**	**1**	**171**

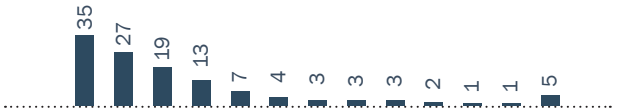
ROBINSON

RANKING **No.7**

MOST POPULAR **R66**

GROWTH **11 ▲ 9.8% ▲**

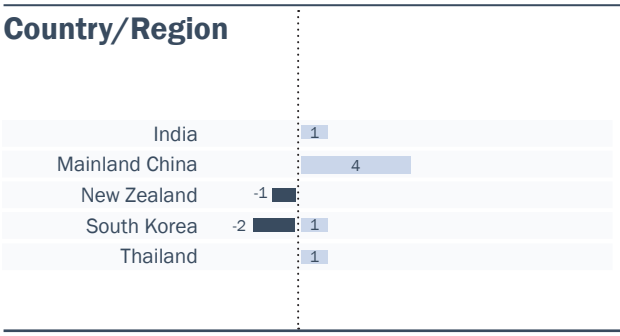
LARGEST FLEET **Australia**



	AUSTRALIA	MAINLAND CHINA	JAPAN	BANGLADESH	PHILIPPINES	NEW ZEALAND	INDIA	INDONESIA	MALAYSIA	HONG KONG SAR	SRI LANKA	PNG	OTHERS	TOTAL
R66	35	27	19	13	7	4	3	3	3	2	1	1	5	123
Total	**35**	**27**	**19**	**13**	**7**	**4**	**3**	**3**	**3**	**2**	**1**	**1**	**5**	**123**

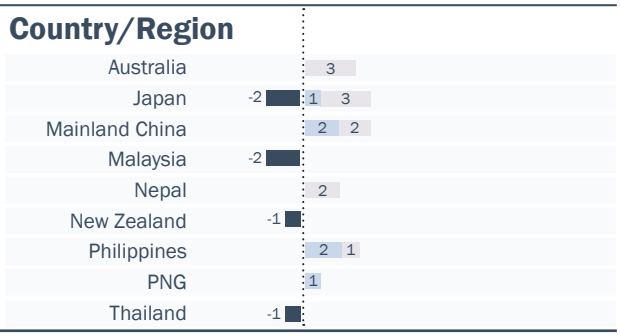
ADDITIONS AND DEDUCTIONS

Country/Region



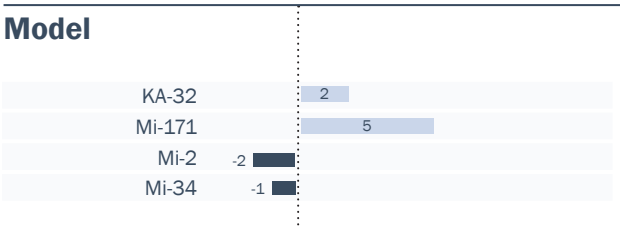
New Deliveries (-) Pre-owned (+7) Deductions (-3)

Country/Region

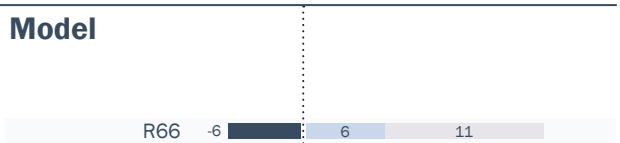


New Deliveries (+11) Pre-owned (+6) Deductions (-6)

Model



Model



Note: Excludes movements between countries/regions in APAC.

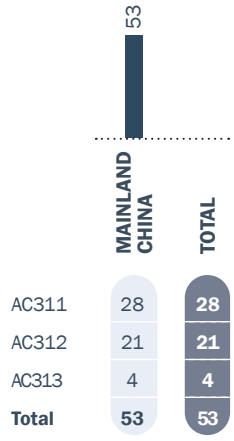
AVICOPTER

RANKING **No.8**

MOST POPULAR **AC311**

GROWTH **2 ▲ 3.9% ▲**

LARGEST FLEET **Mainland China**



	MAINLAND CHINA	TOTAL
AC311	28	28
AC312	21	21
AC313	4	4
Total	**53**	**53**

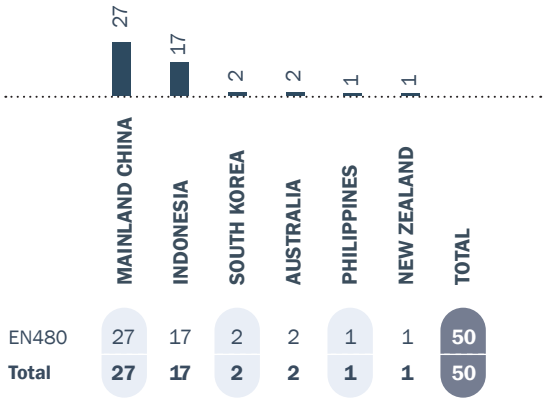
ENSTROM

RANKING **No.9**

MOST POPULAR **EN480**

GROWTH **3 ▲ 6.4% ▲**

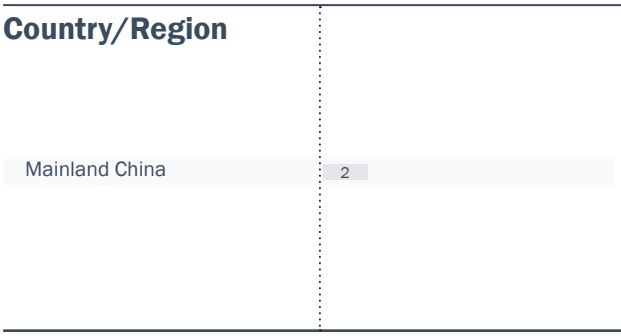
LARGEST FLEET **Mainland China**



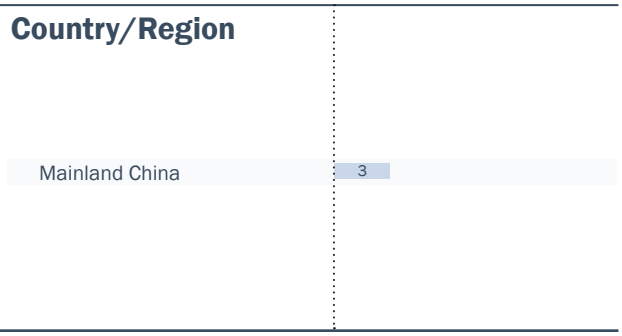
	MAINLAND CHINA	INDONESIA	SOUTH KOREA	AUSTRALIA	PHILIPPINES	NEW ZEALAND	TOTAL
EN480	27	17	2	2	1	1	50
Total	**27**	**17**	**2**	**2**	**1**	**1**	**50**

ADDITIONS AND DEDUCTIONS

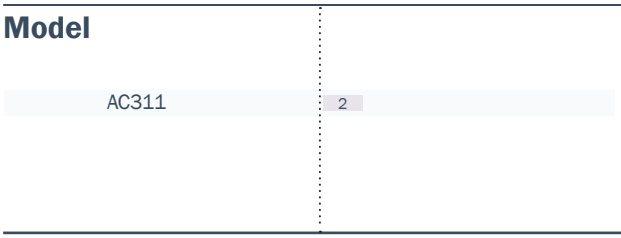
Country/Region



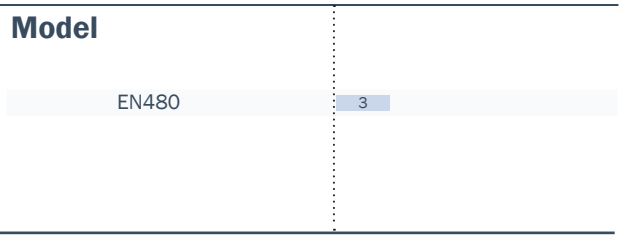
Country/Region



Model



Model



Note: Excludes movements between countries/regions in APAC.

APPENDIX

REGION BREAKDOWN

EAST ASIA

Japan
South Korea
Mongolia

SOUTHEAST ASIA

Brunei
Cambodia
Indonesia
Laos
Malaysia
Myanmar
Philippines
Singapore
Thailand
Vietnam

GREATER CHINA

Mainland China
Hong Kong SAR
Macao SAR
Taiwan

SOUTH ASIA

Bangladesh
Bhutan
India
Maldives
Nepal
Sri Lanka

OCEANIA

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

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
H215
H225
AC313
Mi-17
Mi-171
Mi-26
Mi-8
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ABOUT ASIAN SKY GROUP

ASIAN SKY GROUP (ASG), headquartered in Hong Kong with offices throughout Asia, has assembled the most experienced aviation team in the Asia-Pacific region to provide a wide range of independent services for both fixed and rotary-wing aircraft. ASG also provides access to a significant customer base around the world with the help of its exclusive partners.

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Asian Sky Media has a growing portfolio of business aviation reports designed to provide valuable information to readers for a better understanding of the market. Included in the portfolio is the Asia-Pacific Fleet Reports for civil helicopters, business jets, business jet charter, as well as comprehensive reports on regional training schools and aviation infrastructure. Asian Sky Media also has a focus report on general aviation in China, with the China GA Report, while Asian Sky Quarterly provides a reader-friendly look at market dynamics within the pre-owned markets of civil helicopters and business jets.

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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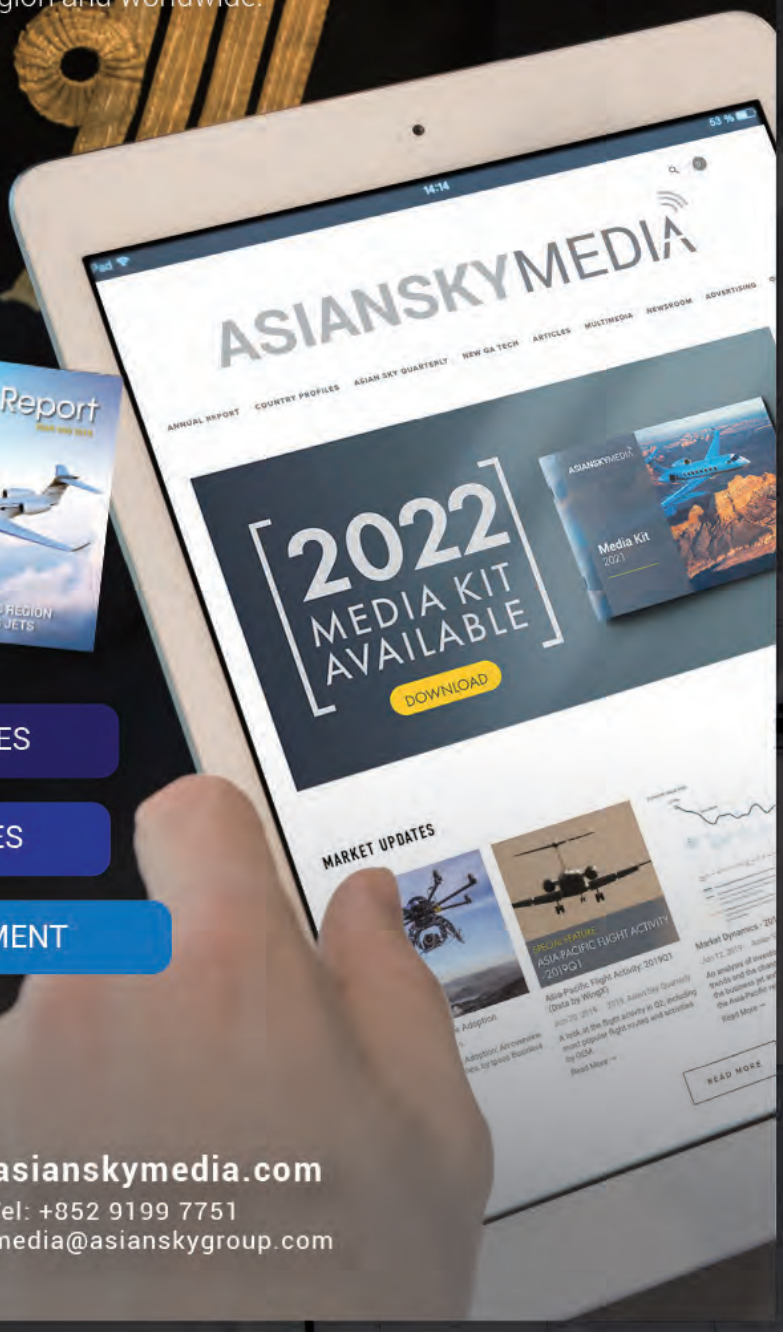

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