

Defense/Aerospace (Overweight/Initiate) Chain reaction



C O N T E N T S

Executive summary	3
Korea stands to benefit the most from defense paradigm shift	3
Korea's growing defense exports to trigger multiple expansion	3
Our top pick is KAI; second preferred pick is LIG Nex1	3
I. Investment strategy and valuation	6
Recommend Overweight on defense/aerospace	6
Korea's growing defense exports to trigger multiple expansion	7
Our top pick is KAI; second preferred pick is LIG Nex1	9
II. Conditions for growth remain intact	13
The age of global military expansion has arrived	13
Premature to worry about demand peaking	18
Paradigm shift in the defense market	24
III. Growing appeal of Korean defense products	27
Unparalleled strategic value	27
Expanding into the global market	28
Opportunities in the global market	35
IV. Space: The next battleground	42
Space technology has proven military applications	42
Cost innovation to lay the foundation for growth	44
Entering a new space age	45
Will the space business be profitable?	48
Company analysis	49
Korea Aerospace Industries	50
LIG Nex1	67
Hanwha Aerospace	75
Hyundai Rotem	84
Hanwha Systems	91

Executive summary

Korea stands to benefit the most from defense paradigm shift

We initiate our coverage on the defense/aerospace sector with an Overweight opinion. The Russia-Ukraine War has shown that a mix of advanced and conventional weapons is important in modern warfare, leading to a boost in demand for conventional weapons from countries around the world. This defense paradigm shift has boosted Korea's defense exports, which for the first time ever have more than doubled for two consecutive years. Korean arms are highly competitive, being 34% cheaper on average than competing models. Moreover, delivery times are two to 10 years shorter. We expect Korean defense companies to continue to benefit strongly from global industry trends.

Korea's growing defense exports to trigger multiple expansion

Korea's defense industry is transitioning away from domestic demand to exports, which are more profitable. Export expansion can create operating leverage effects by reducing the development cost burden while boosting prices and delivery volumes. We forecast large defense companies' 2025 defense revenue to grow to W16tr (2021-25 CAGR of 19.8%), with exports surging at a CAGR of 93.2%. We see exports as a percentage of revenue increasing from 6% in 2021 to 40% in 2025, driving up OP margin from 4.9% to 9.9%. Defense companies look well-positioned for earnings growth and multiple expansion, fueled by an increasing global market presence.

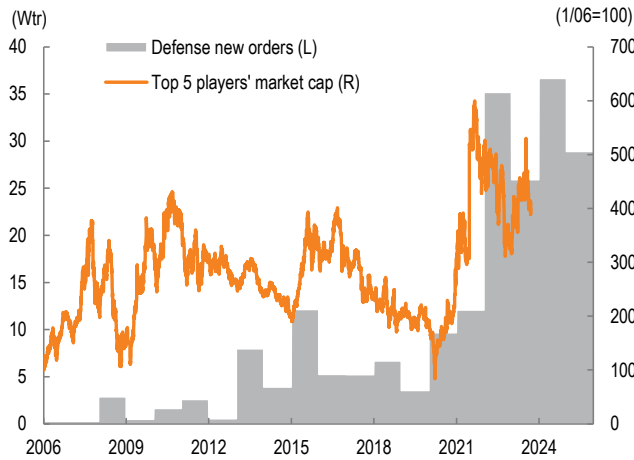
Our top pick is KAI; second preferred pick is LIG Nex1

We initiate our coverage on Korea Aerospace Industries (KAI) with a Buy rating and target price of W76,000. We highlight three key investment points: 1) the beginning of KF-21 (fighter jet) and light armed helicopter (LAH) mass production; 2) FA-50 export momentum; and 3) entry into the US jet trainer market with the T-50. For 2H23, we see earnings turning around on the recognition of the first batch of FA-50GF light fighters delivered to Poland. For 3Q23, we anticipate revenue of W1tr (+69.4% YoY) and OP margin of 10.3%.

Looking to 2025, we forecast revenue of W4.58tr (2022-25 CAGR of 18%). We see exports as a percentage of revenue rising to 42.7%, pushing up OP margin from 5.1% in 2022 to 8.4% in 2025. In 2025, we estimate KAI's aircraft exports will reach W1.58tr (2022-25 CAGR of 131.8%). For the domestic business, we believe revenue from KF-21 and LAH mass production will expand at a CAGR of 63% from W514bn in 2023 to W3.62tr in 2027, serving as a long-term driver of overall revenue.

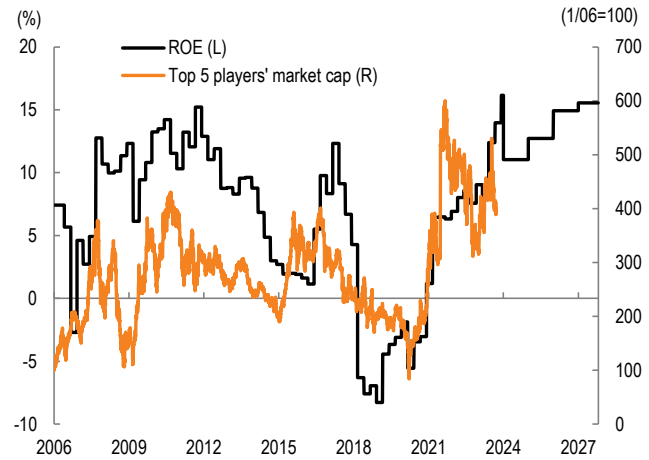
We initiate our coverage on LIG Nex1 with a Buy rating and target price of W130,000. We highlight three key investment points: 1) Korea's "3K" security policy and the implementation of related programs; 2) potential exports to Europe, the Middle East, and Southeast Asia; and 3) promising future programs, such as the long-range surface-to-air missile (L-SAM) and low-altitude missile defense (LAMD) systems. For 2025, we forecast revenue of W3.34tr (2022-25 CAGR of 10.8%). We see exports as a percentage of revenue climbing to 25%, driving up OP margin from 8.1% in 2022 to 10.2% in 2025. We expect order backlog to grow from W12tr in 2022 to W23tr in 2025. Our 2024 order backlog estimate includes a Cheongung II contract for Saudi Arabia (estimated at W5-7tr), which is expected in late 2023.

Figure 1. Top five domestic defense companies: New orders and market cap



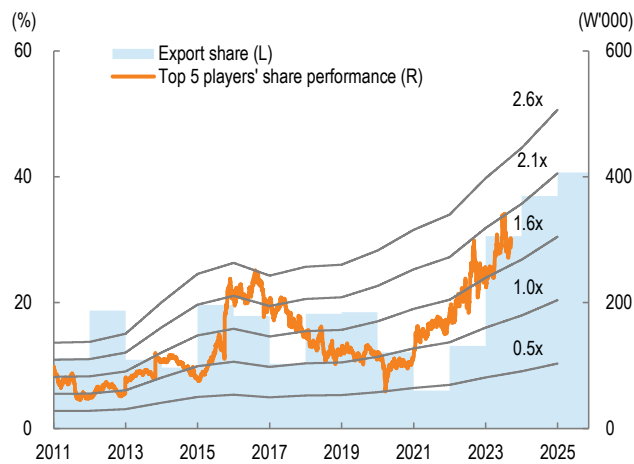
Source: QuantiWise, Mirae Asset Securities Research

Figure 2. Top five domestic defense companies: ROE and market cap



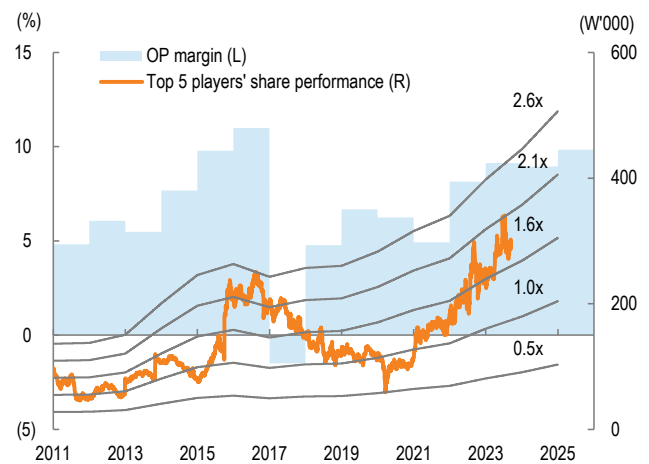
Source: QuantiWise, Mirae Asset Securities Research

Figure 3. Top five domestic defense companies: Export share and 12-month forward P/B band



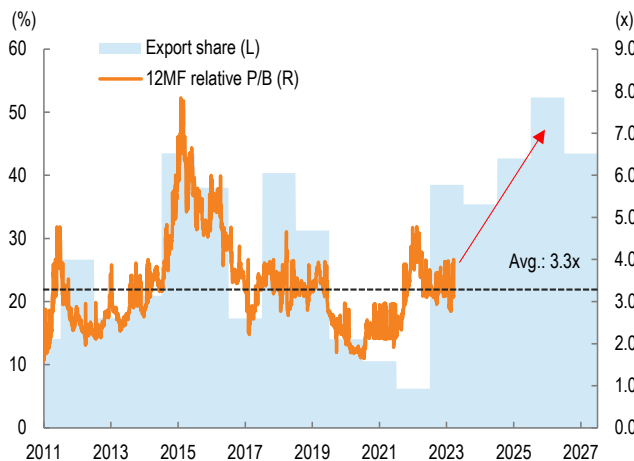
Source: QuantiWise, Mirae Asset Securities Research

Figure 4. Top five domestic defense companies: OP margin and 12-month forward P/B band



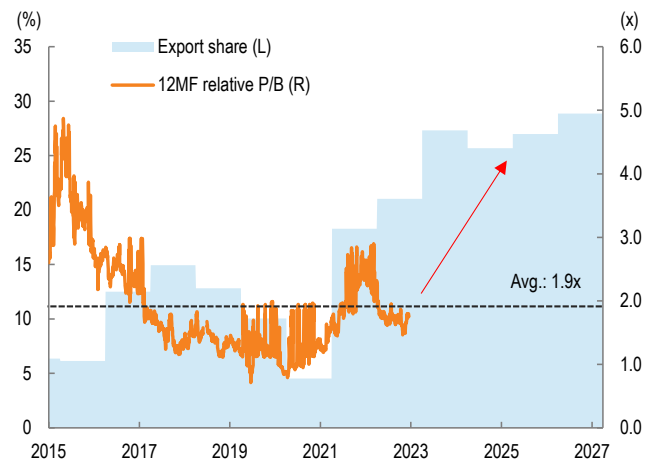
Source: QuantiWise, Mirae Asset Securities Research

Figure 5. KAI: Export share and 12-month forward relative P/B



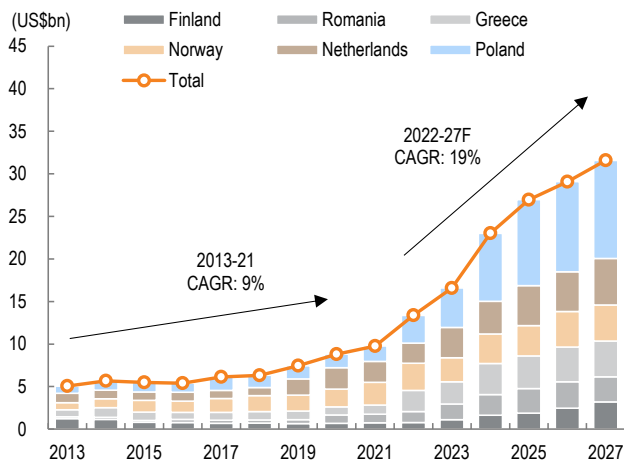
Source: QuantiWise, Mirae Asset Securities Research

Figure 6. LIG Nex1: Export share and 12-month forward relative P/B



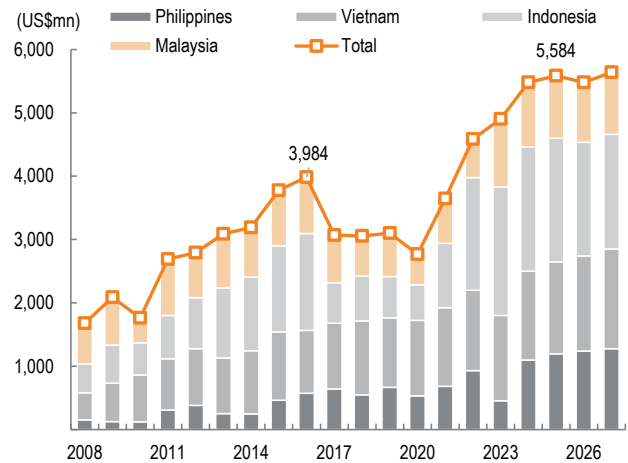
Source: QuantiWise, Mirae Asset Securities Research

Figure 7. Major European defense importers' potential weapons acquisitions



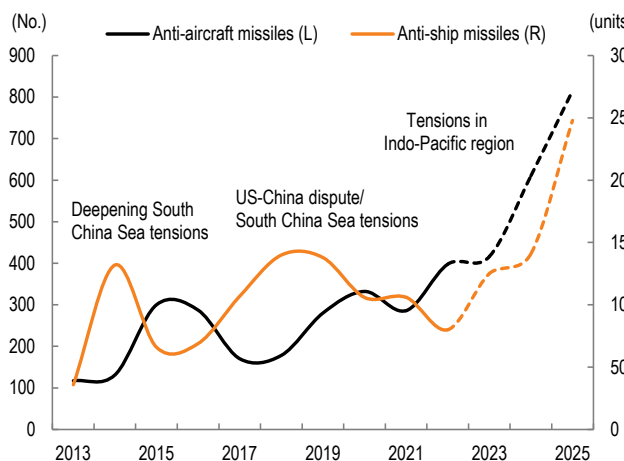
Source: Janes, Mirae Asset Securities Research

Figure 8. South China Sea countries' weapons acquisition budget trends and forecasts



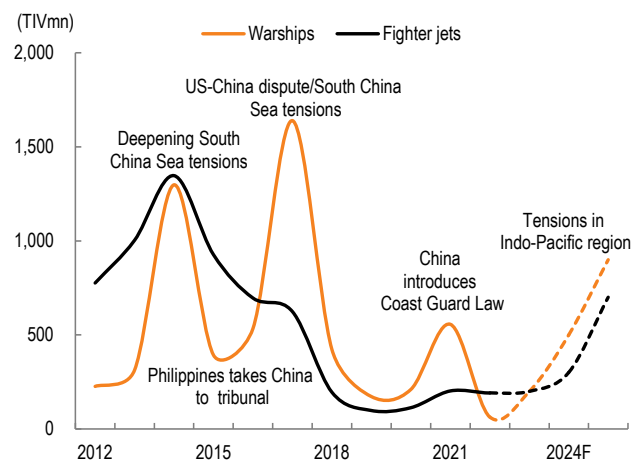
Source: Industry data, Mirae Asset Securities Research

Figure 9. South China Sea countries' anti-air/anti-ship missile acquisition trends



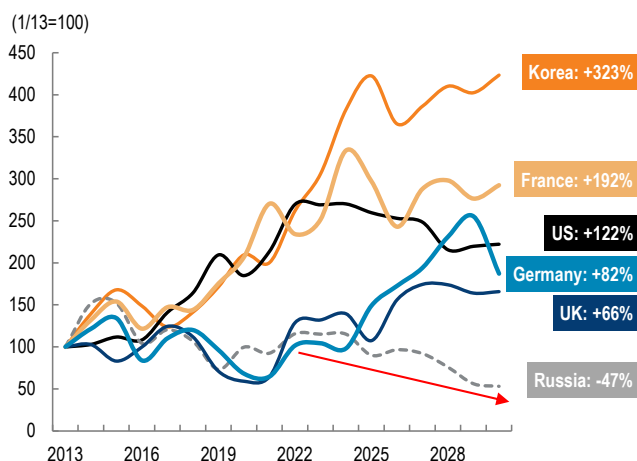
Source: SIPRI, Mirae Asset Securities Research

Figure 10. South China Sea countries' warship/jet import trends



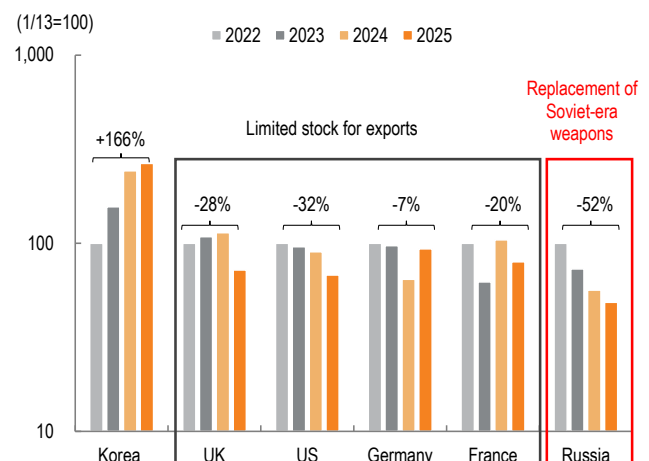
Notes: TIV is SIPRI's proprietary unit and represents the effective value of weapons
Source: SIPRI, Mirae Asset Securities Research

Figure 11. Projected growth of conventional weapons revenue by country (cumulative basis)



Note: Reflects combined revenue (domestic and exports) of previously won contracts for fighter jets, main battle tanks, and self-propelled howitzers
Source: Janes, Mirae Asset Securities Research

Figure 12. Projected growth of conventional weapon exports by country (cumulative basis)



Note: Reflects combined revenue (exports) of previously won contracts for fighter jets, main battle tanks, and self-propelled howitzers
Source: Janes, Mirae Asset Securities Research

I. Investment strategy and valuation

Recommend Overweight on defense/aerospace

We initiate our coverage on the defense/aerospace sector with an Overweight opinion. In the wake of the Russia-Ukraine war, we believe Korean defense companies have an unprecedented opportunity to expand their global presence.

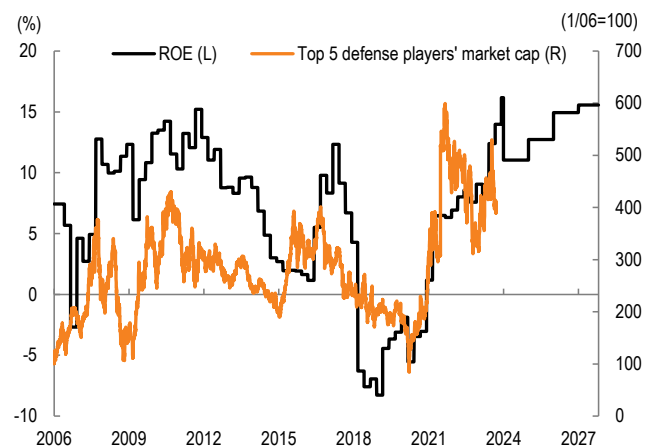
Major domestic defense companies have seen their new order intake grow sharply from around W5tr previously to W10-35tr in 2021-22. Notably, export contracts account for more than half of the new orders. Based on export deals that have been confirmed, we expect the top five domestic defense companies' average OP margin and ROE to reach 9.9% and 12.7%, respectively, in 2025. And given that a number of additional overseas contracts are likely to be inked in the coming years, the above estimates will likely be revised up, and share price momentum will likely strengthen.

Figure 13. Top five domestic defense companies: New orders and market cap



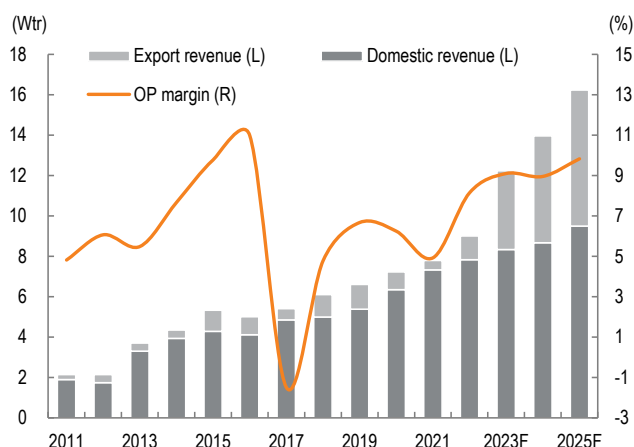
Note: Market cap adjusted to account for IPOs
Source: Company data, Mirae Asset Securities Research estimates

Figure 14. Top five domestic defense companies: ROE and market cap



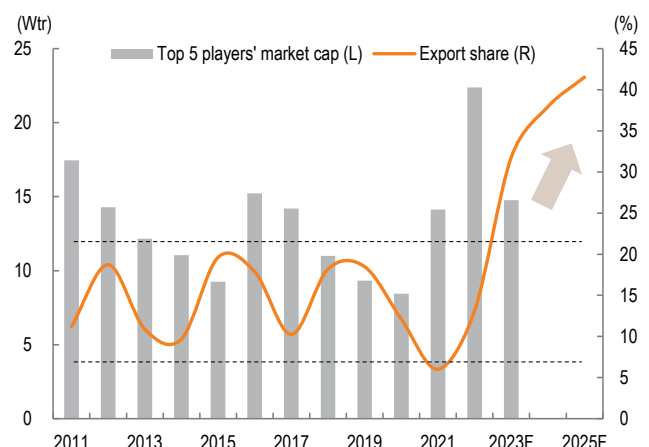
Note: Market cap adjusted to account for IPOs
Source: QuantiWise, Mirae Asset Securities Research estimates

Figure 15. Top five domestic defense companies: Earnings trends



Source: Company data, Mirae Asset Securities Research estimates

Figure 16. Top five domestic defense companies: Market cap and export share



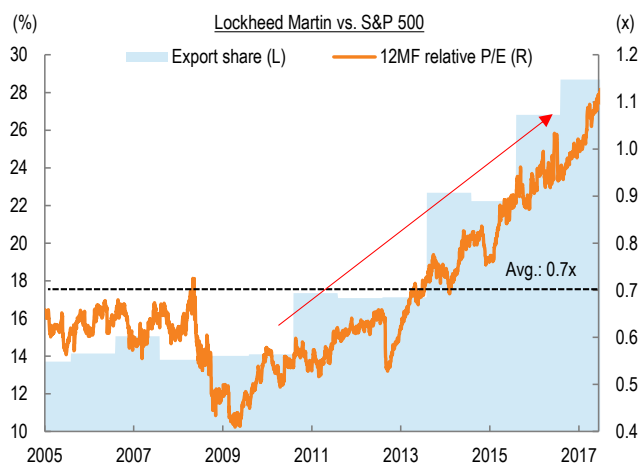
Note: Market cap adjusted to account for IPOs
Source: QuantiWise, Mirae Asset Securities Research estimates

Korea's growing defense exports to trigger multiple expansion

Korea's defense industry is transitioning away from domestic demand to exports, which are more profitable. Export growth can create leverage effects by reducing the development cost burden while boosting prices and volumes. We forecast key domestic players' 2025 defense revenue to grow to W16tr (2021-25 CAGR of 19.8%), with exports displaying 93.2% CAGR. We see exports as a percentage of revenue rising from 6% in 2021 to 40% in 2025, pushing OP margin from 4.9% to 9.9%. Defense firms look well-positioned for earnings and multiple expansion, fueled by a growing global presence.

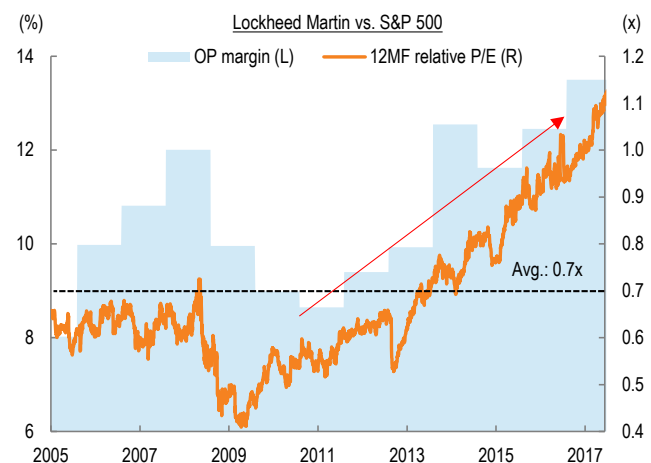
Leading US defense firm Lockheed Martin is a classic example of an export-driven re-rating. Between 2005 and 2017, the company saw its share of exports rise from 10% to 29%. During that period, OP margin expanded 5.5%p, and the stock's 12-month forward relative P/E expanded from 0.7x to 1.1x. Demand for US-made weapons increased over this period (with the US government providing support for exports) amid the escalation of military conflicts in the Middle East (Iraq and Afghanistan wars) and intensification of disputes over the South China Sea. As a result, US defense companies enjoyed an industry boom—similar to what Korea is experiencing today.

Figure 17. Lockheed Martin: Export share and 12-month forward relative P/E



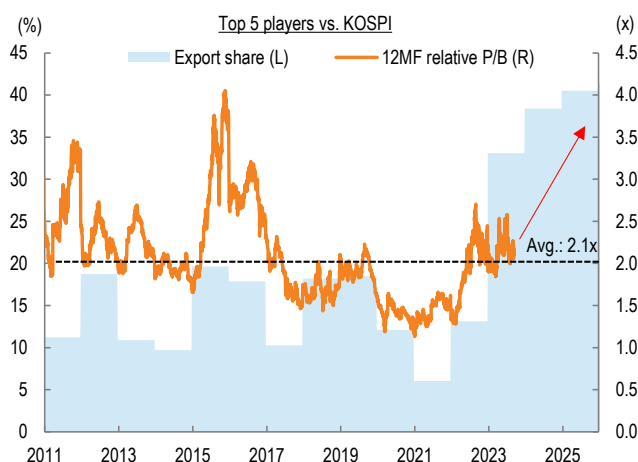
Source: Bloomberg, Mirae Asset Securities Research

Figure 18. Lockheed Martin: OP margin and 12-month forward relative P/E



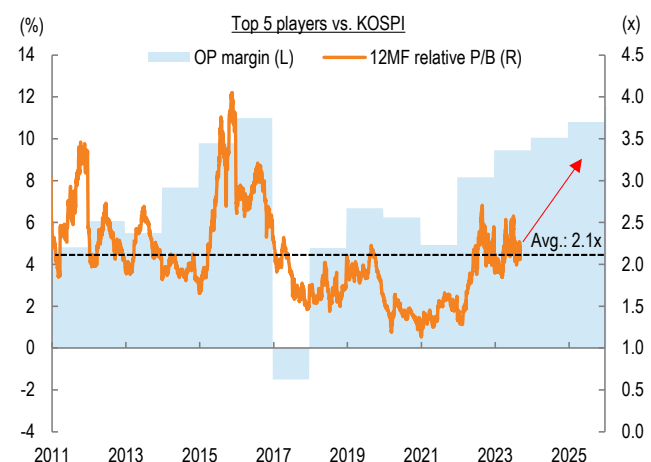
Source: Bloomberg, Mirae Asset Securities Research

Figure 19. Top five domestic defense companies: Export share and 12-month forward relative P/B



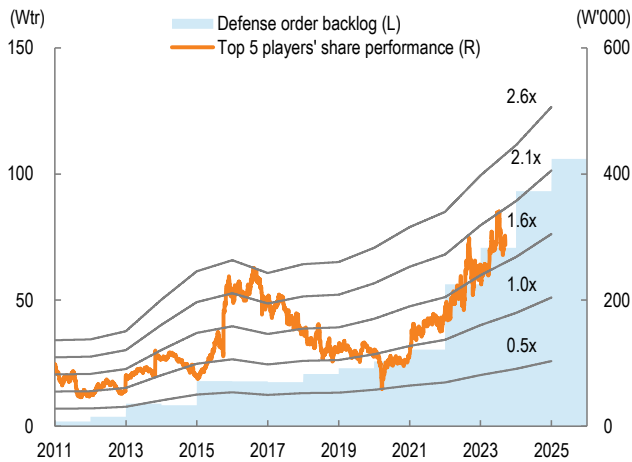
Source: QuantiWise, Mirae Asset Securities Research

Figure 20. Top five domestic defense companies: OP margin and 12-month forward relative P/B



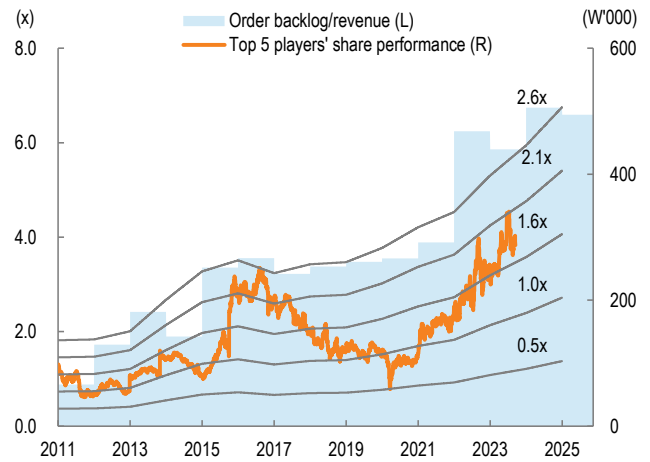
Source: QuantiWise, Mirae Asset Securities Research

Figure 21. Top five domestic defense companies: Defense order backlog and 12-month forward P/B band



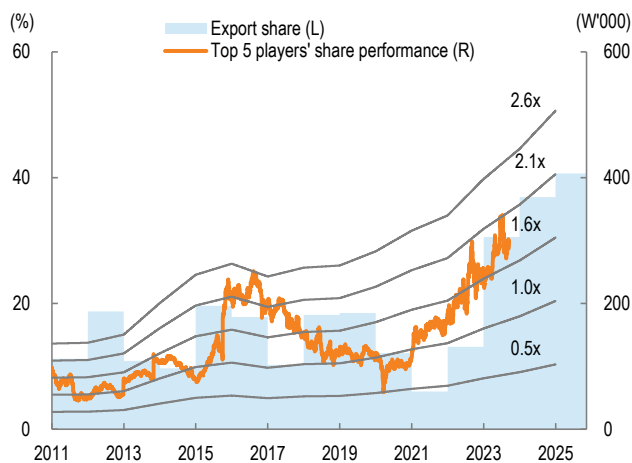
Source: QuantiWise, Mirae Asset Securities Research

Figure 22. Top five domestic defense companies: Order backlog/revenue ratios and 12-month forward P/B band



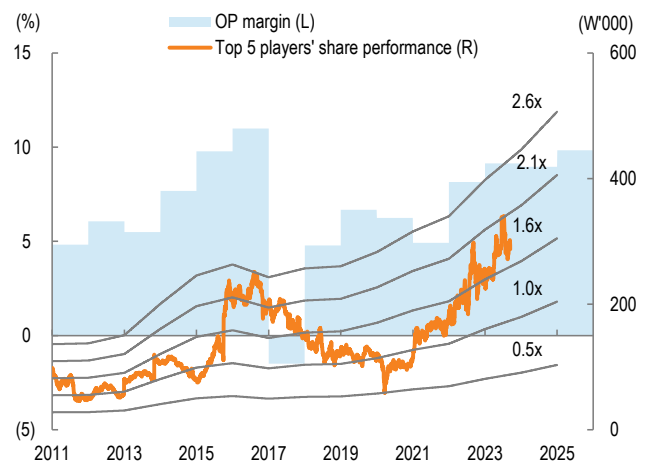
Source: QuantiWise, Mirae Asset Securities Research

Figure 23. Top five domestic defense companies: Export share and 12-month forward P/B band



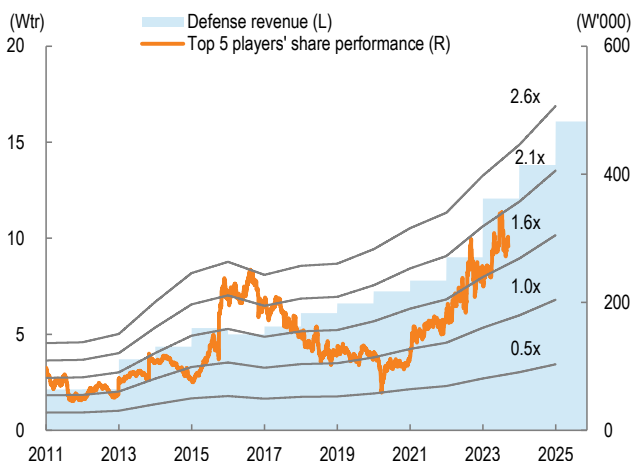
Source: QuantiWise, Mirae Asset Securities Research

Figure 24. Top five domestic defense companies: OP margin and 12-month forward P/B band



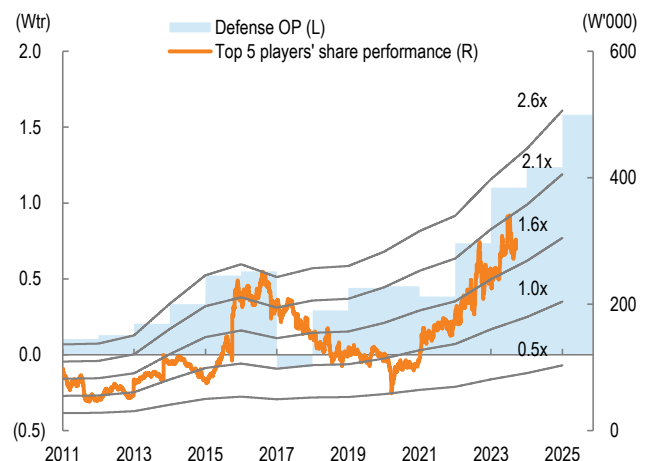
Source: QuantiWise, Mirae Asset Securities Research

Figure 25. Top five domestic defense companies: Defense revenue and 12-month forward P/B band



Source: QuantiWise, Mirae Asset Securities Research

Figure 26. Top five domestic defense companies: Defense OP and 12-month forward P/B band



Source: QuantiWise, Mirae Asset Securities Research

Our top pick is KAI; second preferred pick is LIG Nex1

We initiate our coverage on Korea Aerospace Industries (KAI) with a Buy rating and target price of W76,000. We highlight three key investment points: 1) the beginning of KF-21 and LAH mass production; 2) FA-50 export momentum; and 3) entry into the US jet trainer market with the T-50. For 2H23, we see earnings turning around on the recognition of the first batch of FA-50GF light fighters delivered to Poland. For 3Q23, we anticipate revenue of W1tr (+69.4% YoY) and an OP margin of 10.3%.

Looking to 2025, we forecast revenue of W4.58tr (2022-25 CAGR of 18%). We see exports as a percentage of revenue rising to 42.7%, pushing up OP margin from 5.1% in 2022 to 8.4% in 2025. In 2025, we estimate KAI's aircraft exports will reach W1.58tr (2022-25 CAGR of 131.8%). For the domestic business, we believe revenue from KF-21 and LAH mass production will expand at a CAGR of 63% from W514bn in 2023 to W3.62tr in 2027, serving as a long-term driver of overall revenue.

We initiate our coverage on LIG Nex1 with a Buy rating and target price of W130,000. We highlight three key investment points: 1) Korea's "3K" security policy and the implementation of related programs; 2) potential exports to Europe, the Middle East, and Southeast Asia; and 3) promising future programs, such as L-SAM and LADM systems. For 2025, we forecast revenue of W3.34tr (2022-25 CAGR of 10.8%). We see exports as a percentage of revenue climbing to 25%, driving up OP margin from 8.1% in 2022 to 10.1% in 2025. We expect order backlog to grow from W12tr in 2022 to W23tr in 2025. Our 2024 order backlog estimate includes a Cheongung II contract for Saudi Arabia (estimated at W5-7tr), which is expected in late 2023.

Table 1. Five defense/aerospace companies under our coverage: Investment points and earnings summary (Wbn, %, x)

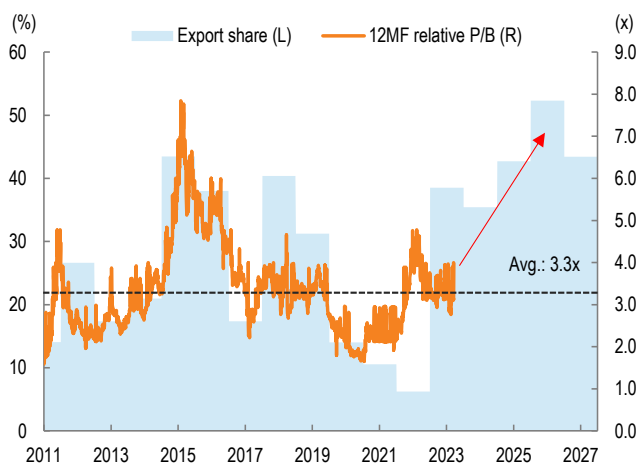
Company			Market cap	Investment points	Year	Revenue	OP margin	ROE	P/B
KAI Top pick (47810 KS)	Rating	Buy	4,796	① Beginning of KF-21/LAH mass production	2023F	3,783	7.6	16.7	2.9
	TP	76,000		② Additional FA-50 exports	2024F	3,773	6.9	12.1	2.7
	Upside	54.5%		③ Entry into US trainer market with T-50	2025F	4,580	8.4	15.1	2.3
LIG Nex1 (079550 KS)	Rating	Buy	1,877	① Biggest beneficiary of Korea's 3K defense spending	2023F	2,509	8.1	16.6	1.7
	TP	130,000		② Potential exports to the Middle East and Southeast Asia	2024F	2,962	8.9	17.8	1.5
	Upside	52.4%		③ Plenty of promising future programs, including L-SAM and LADM	2025F	3,413	10.2	19.8	1.3
Hanwha Aerospace (012450 KS)	Rating	Buy	5,534	① Revenue recognition for deliveries to Poland in 2H23	2023F	8,557	7.4	25.6	1.7
	TP	150,000		② Additional exports of K9 self-propelled howitzer	2024F	9,713	7.5	9.3	1.6
	Upside	37.2%		③ Possibility of additional exports (Redback, Biho, etc.)	2025F	10,474	8.2	10.6	1.4
Hyundai Rotem (064350 KS)	Rating	Buy	3,252	① Domestic mass production of K2 tanks/wheeled armored vehicles	2023F	3,410	5.1	8.2	2.0
	TP	37,000		② Additional K2 exports	2024F	3,884	6.5	10.9	1.8
	Upside	25.2%		③ Execution of overseas rail projects (Australia, etc.)	2025F	4,459	7.4	12.8	1.6
Hanwha Systems (272210 KS)	Rating	Buy	2,371	① Continuation of military satellite communication/TICN mass production	2023F	2,390	3.7	15.7	1.2
	TP	19,000		② Defense parts contracts with Poland/UAE	2024F	2,548	5.0	6.4	1.1
	Upside	51.4%		③ Space internet/UAM new business momentum	2025F	2,720	5.9	7.3	1.1

Source: Mirae Asset Securities Research

Shares of Hanwha Aerospace and Hyundai Rotem have performed relatively strongly since last year, as exports have begun to contribute meaningfully to revenue with the delivery of “gap filler” volumes to Poland (which started in 4Q22). Indeed, the two stocks have seen their 12-month forward relative P/Bs exceed their respective 10-year averages. This suggests that KAI and LIG Nex1, whose relative P/Bs remain at average levels, could see their multiples expand as export momentum materializes.

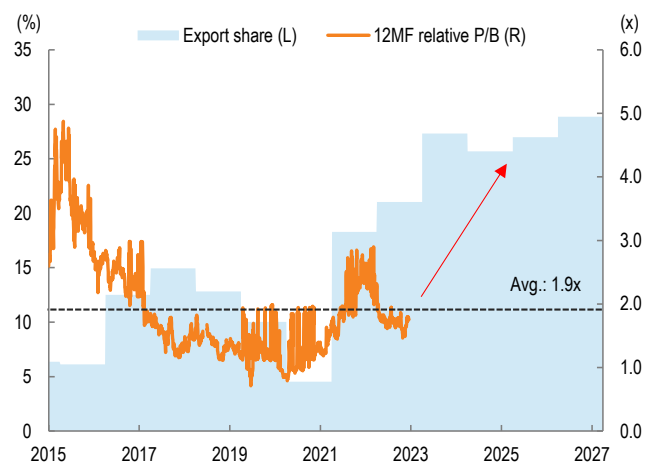
For KAI, we expect share price momentum to come from the potential expansion of export destinations for the FA-50 (Egypt, the Philippines, Uzbekistan, etc.) and the firm's entry into the US jet trainer market with the T-50. LIG Nex1's stock could also enjoy a strong boost if Cheongung II exports to Saudi Arabia are confirmed in late 2023.

Figure 27. KAI: Export share and 12-month forward relative P/B



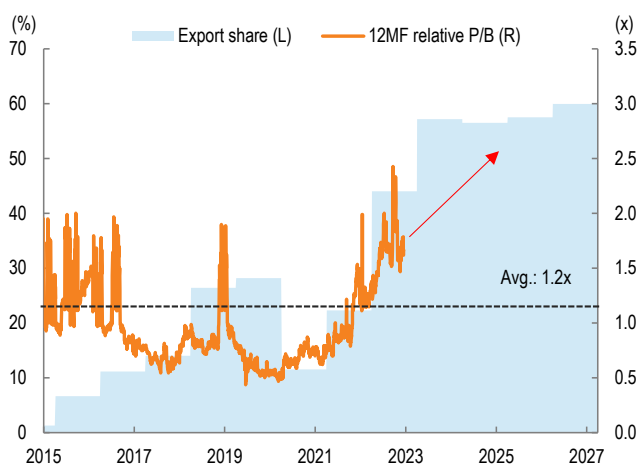
Source: QuantiWise, Mirae Asset Securities Research

Figure 28. LIG Nex1: Export share and 12-month forward relative P/B



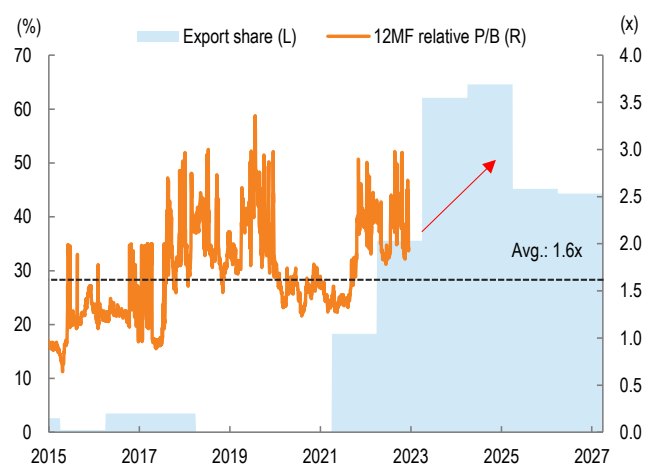
Source: QuantiWise, Mirae Asset Securities Research

Figure 29. Hanwha Aerospace: Export share and 12-month forward relative P/B



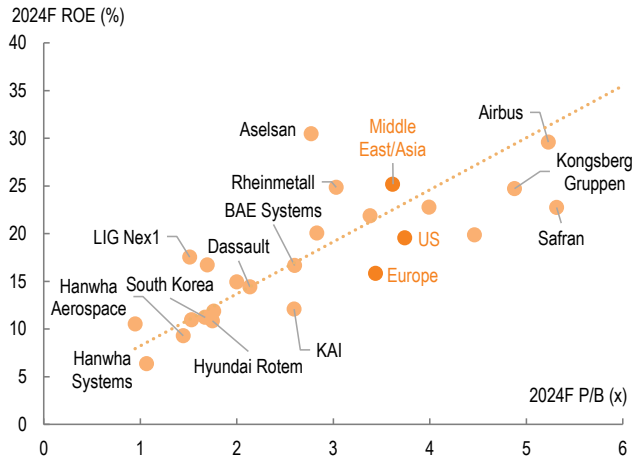
Source: QuantiWise, Mirae Asset Securities Research

Figure 30. Hyundai Rotem: Export share and 12-month forward relative P/B



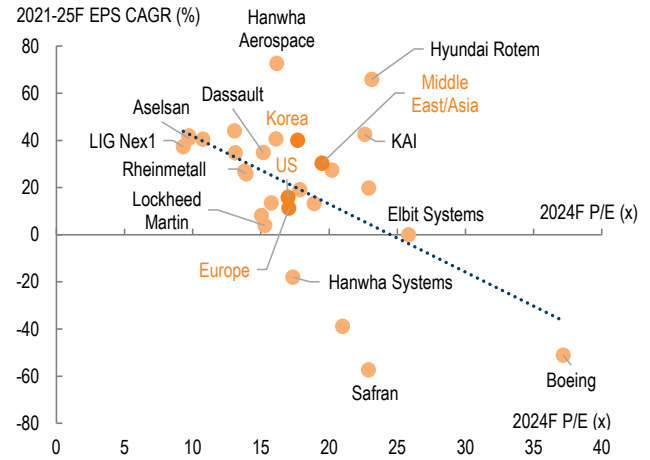
Source: QuantiWise, Mirae Asset Securities Research

Figure 31. 2024F P/B-ROEs of defense companies



Source: Bloomberg, Mirae Asset Securities Research

Figure 32. 2024F P/E- EPS growth (5Y CAGR) of defense companies



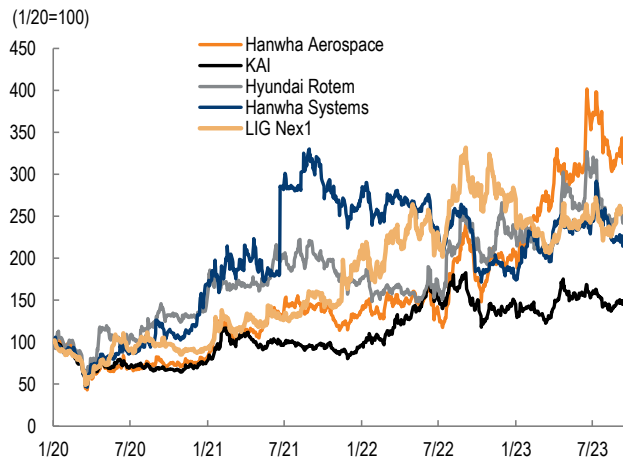
Source: Bloomberg, Mirae Asset Securities Research

Table 2. Peer valuation table

Company	Market cap (US\$bn)	Share performance		Revenue growth (%)		P/E (x)		P/B (x)		ROE (%)		EPS CAGR (%)
		1M	YTD	24F	25F	24F	25F	24F	25F	24F	25F	21-25F
Korea	2.7	3.7	12.2	10.4	12.7	18.2	14.0	1.7	1.5	11.3	13.1	40.0
Hanwha Aerospace	4.2	1.3	48.1	13.5	7.8	17.3	13.9	1.6	1.4	9.3	10.6	72.8
KAI	3.6	4.9	-3.2	-0.3	21.4	23.1	16.4	2.7	2.3	12.1	15.1	42.5
Hyundai Rotem	2.4	3.0	4.0	13.9	14.8	23.1	17.4	1.8	1.6	10.9	12.8	65.9
Hanwha Systems	1.8	-5.4	18.7	6.6	6.8	18.4	15.3	1.1	1.1	6.4	7.3	-18.1
LIG Nex1	1.4	14.8	-6.5	18.2	12.9	9.1	7.1	1.5	1.3	17.8	19.4	37.1
North America	65.5	-3.3	-6.9	7.6	4.5	17.0	13.9	3.7	3.5	19.6	16.5	15.8
RTX	109.4	-12.4	-25.5	8.4	7.3	13.8	11.4	1.5	1.5	11.0	12.9	26.9
Boeing	123.7	-9.5	7.7	16.6	8.9	37.2	22.0	N/A	N/A	-17.9	-45.2	-51.1
Lockheed Martin	108.3	-4.5	-11.6	2.8	3.6	15.3	14.8	12.4	11.2	77.0	74.2	4.0
Northrop Grumman	66.7	2.4	-19.3	5.6	5.6	17.8	15.7	4.0	3.7	22.8	24.5	19.1
General Dynamics	61.3	0.0	-9.6	6.5	3.6	15.0	13.8	2.8	2.6	20.1	20.7	8.1
L3Harris	33.1	-3.5	-15.9	8.8	5.4	13.1	12.1	1.8	1.7	11.9	12.7	34.8
Oshkosh	6.4	-0.3	11.8	5.8	-1.9	10.7	9.8	1.7	1.6	16.7	16.9	40.6
Textron	15.1	1.2	7.5	6.2	3.8	13.1	11.8	2.0	1.9	14.9	15.4	44.0
Europe	35.3	7.5	41.5	10.3	10.8	17.1	14.6	3.4	3.0	15.8	14.9	11.2
Airbus	109.8	2.6	17.1	11.7	13.2	18.9	15.0	5.2	4.2	29.6	30.1	13.3
Safran	69.2	5.8	29.7	13.4	11.3	22.9	19.0	5.3	4.7	22.7	24.4	-57.4
BAE Systems	39.7	9.5	23.2	5.8	6.8	15.7	14.4	2.6	2.5	16.7	17.6	13.5
Thales	31.2	7.3	16.5	7.8	6.6	16.1	14.7	3.4	3.1	21.9	21.8	40.6
Rolls-Royce	23.4	11.5	140.8	8.3	7.2	21.0	17.5	N/A	N/A	-22.9	-37.4	-38.9
Dassault	15.8	7.7	16.0	8.9	22.6	15.2	12.7	2.1	1.9	14.4	15.5	34.9
Rheinmetall	12.3	6.3	42.4	22.4	15.6	13.9	11.6	3.0	2.7	24.9	25.2	25.8
Leonardo	8.6	8.0	72.0	5.3	4.4	9.7	8.5	0.9	0.9	10.5	11.1	41.9
Kongsberg Gruppen	7.6	9.1	15.8	9.0	9.7	20.2	17.9	4.9	4.5	24.7	25.9	27.4
Middle East/Asia	10.5	4.8	34.7	20.7	16.6	19.5	16.8	3.6	2.9	25.2	24.4	30.3
Hindustan	16.0	5.2	57.4	12.2	13.4	22.9	19.8	4.5	3.8	19.9	19.6	19.8
Elbit Systems	9.0	0.3	23.0	6.7	1.3	25.8	23.1	N/A	N/A	N/A	N/A	N/A
Aselsan	6.5	8.8	23.7	43.2	35.1	9.7	7.6	2.8	2.0	30.5	29.1	40.9

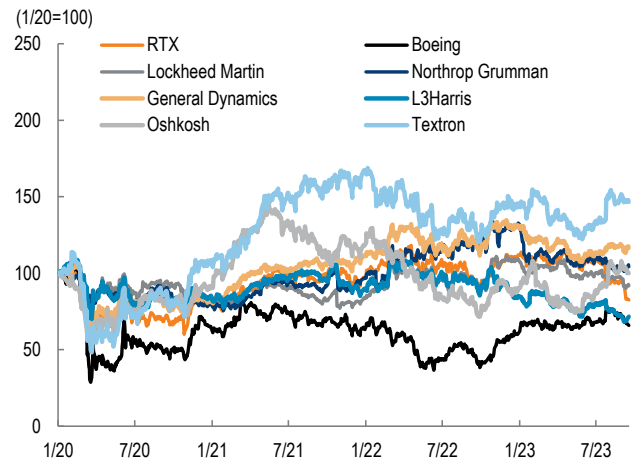
Source: Bloomberg, Mirae Asset Securities Research

Figure 33. Share performances of Korean defense companies



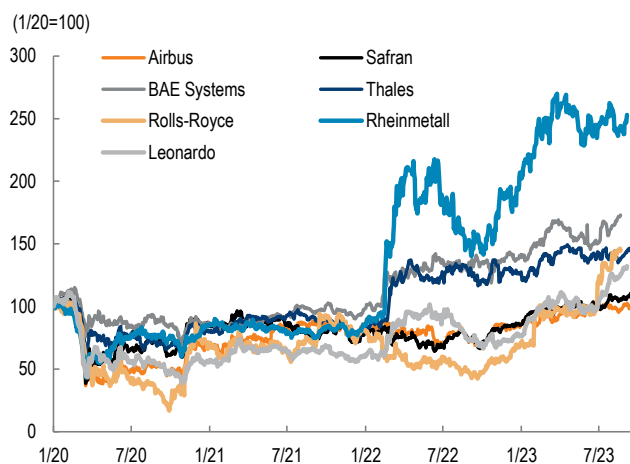
Source: Bloomberg, Mirae Asset Securities Research

Figure 34. Share performances of North American defense companies



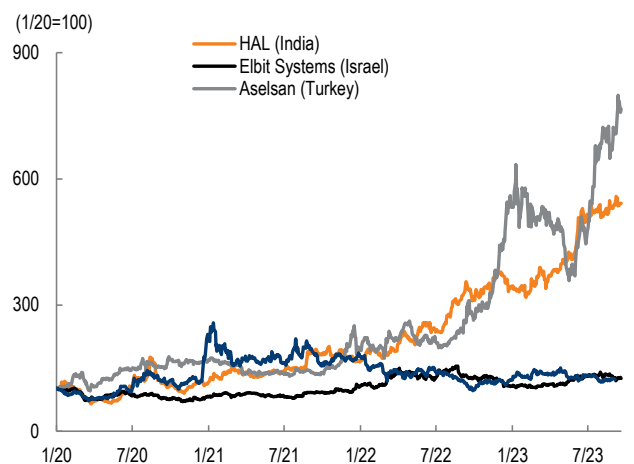
Source: Bloomberg, Mirae Asset Securities Research

Figure 35. Share performances of European defense companies



Source: Bloomberg, Mirae Asset Securities Research

Figure 36. Share performances of Middle Eastern/Asian defense companies



Source: Bloomberg, Mirae Asset Securities Research

II. Conditions for growth remain intact

The age of global military expansion has arrived

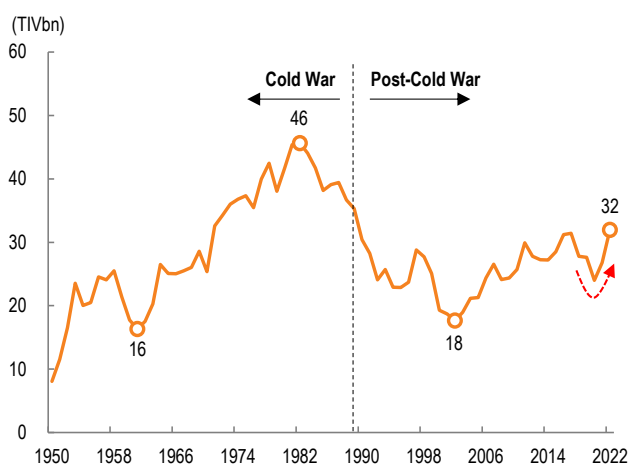
In Feb. 2022, German Chancellor Olaf Scholz said that Russia's invasion of Ukraine marked a turning point in history. Indeed, we see the war in Ukraine as a watershed moment for international politics and the global defense industry. Fearing further aggression, a host of countries are embarking on major rearmament programs. In particular, the rearmament of Europe (which had enjoyed years of peace dividends following the end of the Cold War) has significant implications.

We believe the military buildup taking place globally will become a secular trend, as geopolitical tensions show no signs of easing. Looking ahead, we believe security concerns will continue to shape the emerging international order, bringing forth a period of full-fledged military expansion. Our view is supported by the following factors.

- ① The Russia-Ukraine War has prompted many countries to strengthen their military capabilities.
- ② Countries will need to continue rebuilding their military forces in 2024 and beyond due to depleted supplies and aged weapons.
- ③ Persistent geopolitical uncertainty, especially in the Indo-Pacific region, calls for increases in defense and military strength.

According to the Stockholm International Peace Research Institute (SIPRI), global arms trade in 2022 reached the highest level since the end of the Cold War. As a result, global defense stocks returned 31.2% on average last year, outperforming the broader market. The past three years have marked a historically tumultuous period for the defense industry. In 2020-21, global defense companies fell into a downturn due to supply chain disruptions and stagnant growth in the wake of the pandemic. But in 2022, the Russia-Ukraine War and subsequent rise in demand for arms fueled an industry boom.

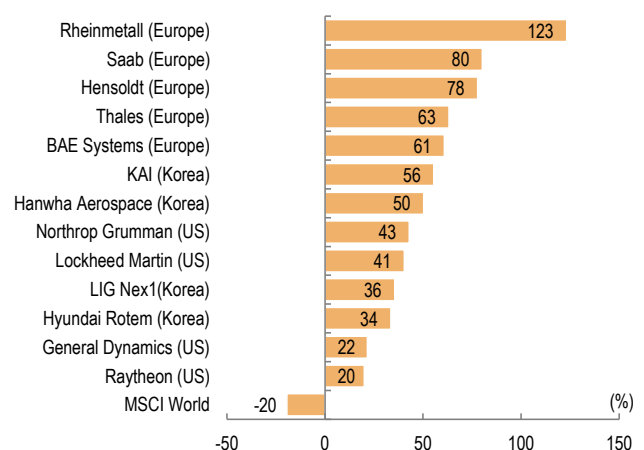
Figure 37. Arms trade reached a post-Cold War record in 2022



Notes: TIV is SIPRI's proprietary unit and represents the effective value of weapon systems; more recently developed weapons have a higher TIV, while older or used systems have depreciated value.

Source: SIPRI, Mirae Asset Securities Research

Figure 38. Global defense stocks' 2022 returns



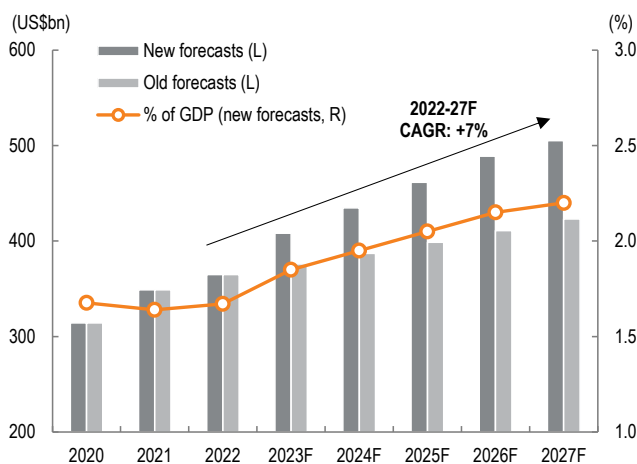
Source: Bloomberg, Mirae Asset Securities Research

Europe's rearmament signals the start of the age of military expansion

Russia's invasion of Ukraine served as a wake-up call for many countries. In particular, governments in Europe intend to spend more on defense in order to rearm and modernize their military forces. A total of 11 countries in the region are expected to spend at least 2% of their GDP on defense in 2023. Demand for weaponry has been particularly strong among countries that border Russia; indeed, Poland, Finland, Norway, and Romania are all aggressively seeking to acquire weapon systems.

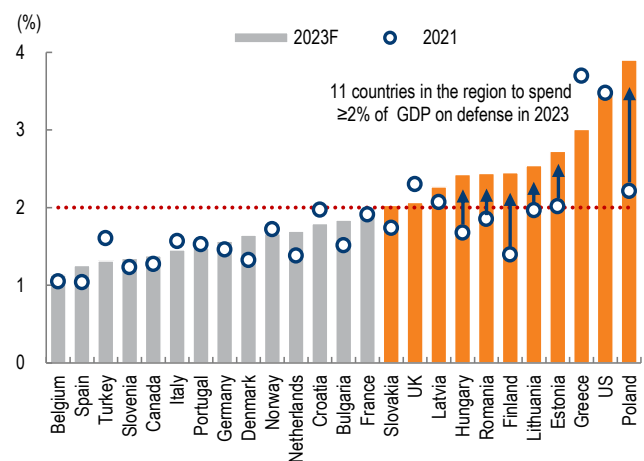
Janes, a leading provider of military data, now forecasts Europe's defense expenditures to increase at a CAGR of 7% between 2022 and 2027; before the Russia-Ukraine War broke out, the forecast was just 3%. The potential size of weapon procurement by major European weapon importers is expected to increase sharply from US\$9.8bn in 2021 (CAGR of 9% in 2013-21) to US\$31.6bn in 2027 (CAGR of 19% in 2022-27F).

Figure 39. Europe's defense spending outlook has been revised up



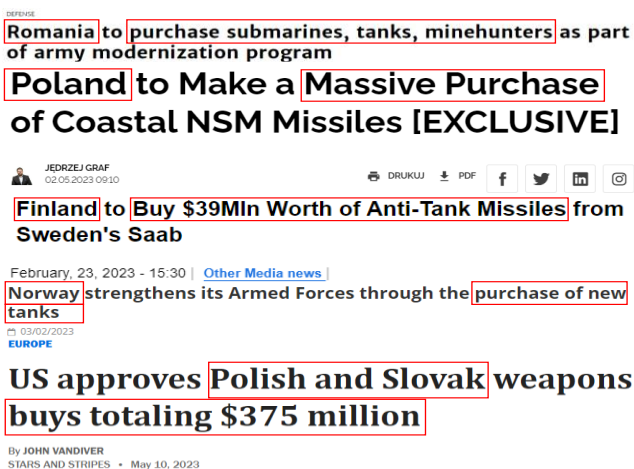
Source: SIPRI, media reports, Mirae Asset Securities Research

Figure 40. NATO members' defense spending forecasts as % of GDP



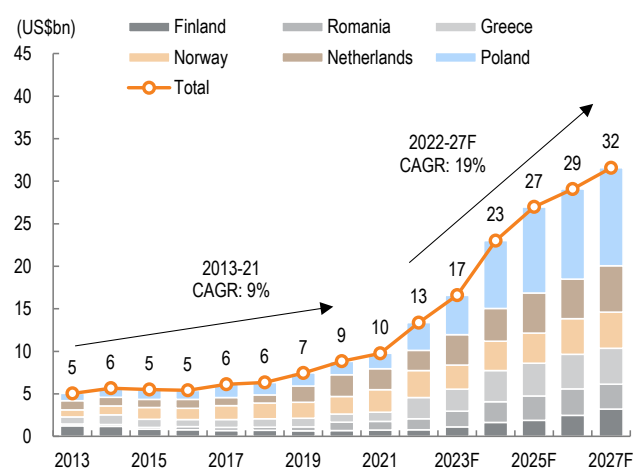
Source: NATO, Mirae Asset Securities Research

Figure 41. NATO members seeking massive weapons procurement



Source: Media reports, Mirae Asset Securities Research

Figure 42. Major European importers' weapons procurement outlook



Note: Weapons procurement forecasts represent confirmed projects plus potential projects.

Source: Janes, Mirae Asset Securities Research

Table 3. NATO members' defense spending as % of GDP and targets

	Country	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023F	Target (year)
Neighbor of Russia/Ukraine	Poland	1.88	2.23	2.00	1.89	2.02	1.99	2.23	2.22	2.40	3.90	4.00 (2023)
Arms producers	US	3.72	3.52	3.52	3.31	3.29	3.51	3.64	3.48	3.45	3.49	2.70 (2024)
	Greece	2.22	2.31	2.40	2.38	2.54	2.45	2.91	3.70	3.86	3.01	Guideline unchanged
Neighbor of Russia	Estonia	1.93	2.03	2.07	2.01	2.01	2.05	2.30	2.02	2.16	2.73	3.26 (2024)
Neighbor of Russia	Lithuania	0.88	1.14	1.48	1.71	1.97	2.00	2.07	1.97	2.47	2.54	3.00 (2028)
Neighbor of Russia	Finland	1.45	1.45	1.42	1.38	1.39	1.45	1.53	1.40	1.68	2.45	Guideline unchanged
Neighbors of Russia/Ukraine	Romania	1.35	1.45	1.43	1.73	1.79	1.84	2.01	1.86	1.72	2.44	2.30 (2025)
	Hungary	0.86	0.90	1.00	1.19	1.01	1.34	1.76	1.68	1.82	2.43	Guideline unchanged
Neighbor of Russia	Latvia	0.94	1.03	1.44	1.59	2.06	2.02	2.15	2.07	2.08	2.27	2.50 (2025)
Arms producer	UK	2.14	2.03	2.08	2.07	2.10	2.08	2.35	2.30	2.16	2.07	2.50 (2030)
Neighbor of Ukraine	Slovakia	0.98	1.11	1.12	1.10	1.22	1.70	1.92	1.74	1.81	2.03	2.00 (2024)
Arms producers	France	1.82	1.78	1.79	1.78	1.81	1.81	2.00	1.91	1.88	1.90	2.00 (2025)
	Montenegro	1.50	1.40	1.42	1.34	1.37	1.33	1.73	1.55	1.41	1.87	2.00 (2024)
	Macedonia	1.09	1.05	0.97	0.89	0.94	1.16	1.24	1.47	1.62	1.87	2.00 (2024)
	Bulgaria	1.31	1.25	1.24	1.22	1.45	3.13	1.59	1.52	1.62	1.84	2.00 (2024)
	Croatia	1.82	1.76	1.60	1.64	1.55	1.61	1.71	1.98	1.82	1.79	N/A
	Albania	1.35	1.16	1.10	1.11	1.16	1.28	1.30	1.24	1.21	1.76	2.21 (2025)
	Netherlands	1.15	1.13	1.16	1.15	1.22	1.32	1.41	1.38	1.63	1.70	2.03 (2024)
	Norway	1.54	1.58	1.73	1.71	1.72	1.84	1.97	1.72	1.51	1.67	2.00 (2026)
	Denmark	1.15	1.11	1.15	1.14	1.28	1.30	1.38	1.32	1.38	1.65	2.00 (2033)
Arms producers	Germany	1.19	1.19	1.20	1.23	1.25	1.35	1.51	1.46	1.49	1.57	2.00 (2025)
	Czechia	0.94	1.02	0.95	1.03	1.10	1.18	1.30	1.39	1.34	1.50	2.00 (2024)
	Portugal	1.31	1.33	1.27	1.24	1.34	1.37	1.43	1.53	1.42	1.48	1.89 (2024)
	Italy	1.14	1.07	1.18	1.20	1.23	1.17	1.59	1.57	1.51	1.46	2.00 (2028)
	Canada	1.01	1.20	1.16	1.44	1.30	1.29	1.42	1.27	1.22	1.38	1.51 (2024)
	Slovenia	0.97	0.93	1.00	0.98	1.01	1.05	1.06	1.24	1.25	1.35	2.00 (2030)
	Turkey	1.45	1.38	1.45	1.51	1.82	1.86	1.86	1.61	1.36	1.31	2.00 (2025)
	Spain	0.92	0.93	0.81	0.91	0.93	0.91	1.01	1.04	1.07	1.26	2.00 (2029)
	Belgium	0.97	0.91	0.89	0.88	0.89	0.89	1.01	1.05	1.19	1.13	1.54 (2030)
	Luxembourg	0.37	0.42	0.38	0.50	0.50	0.55	0.58	0.47	0.62	0.72	1.00 (2028)

Note: Defense budget (constant 2015 currency)/real GDP; higher ratio is highlighted green (military expansion), while lower ratio is highlighted red (military retrenchment)

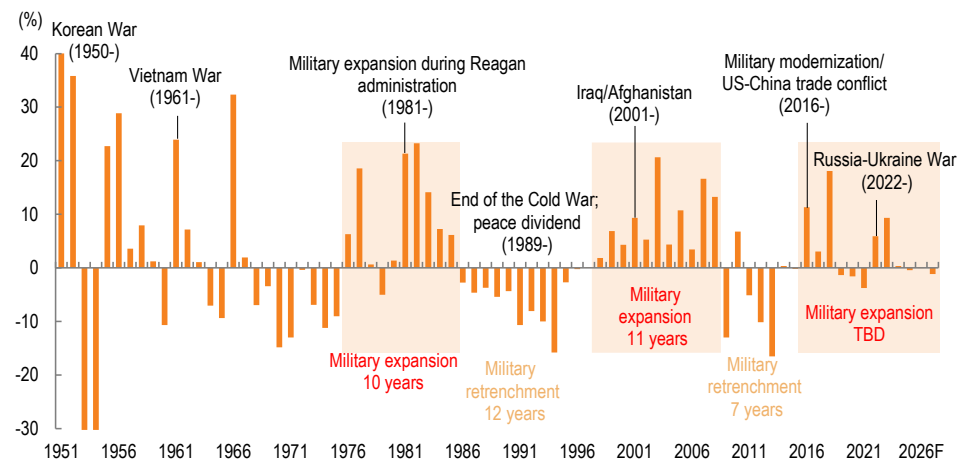
Source: NATO, SIPRI, ICDS, Mirae Asset Securities Research

A look at the defense cycle from the perspective of US defense spending

As the world's biggest defense spender, the US has an enormous impact on the defense market. Thus, changes in the US defense modernization account are a good indicator of the industry cycle. As shown in <Figure 43>, the defense cycle tends to alternate between expansion and retrenchment roughly every 10 years.

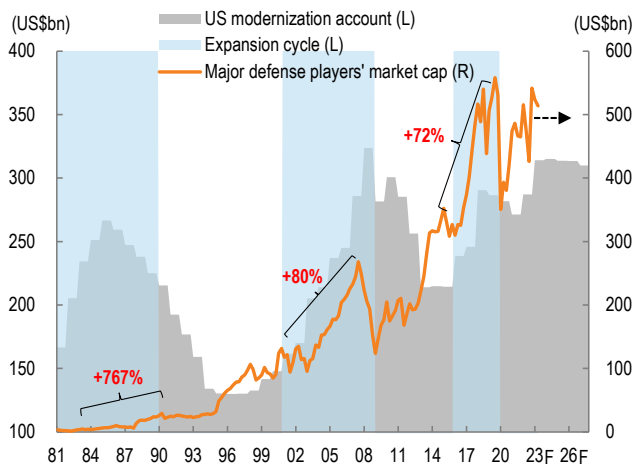
US defense stocks usually outperform the S&P 500 whenever geopolitical tensions flare up, as perceived security threats tend to result in increased military spending. However, 2022 was an exception; US defense stocks saw poor returns, mainly because of inflation and limited budget growth (due to a fiscal deficit). However, we believe this weakness will prove temporary. US weaponry is at the top of the wish list of many countries. With security challenges and military expansion likely to persist, demand for US arms should steadily grow going forward.

Figure 43. Defense cycle from the perspective of US defense modernization account



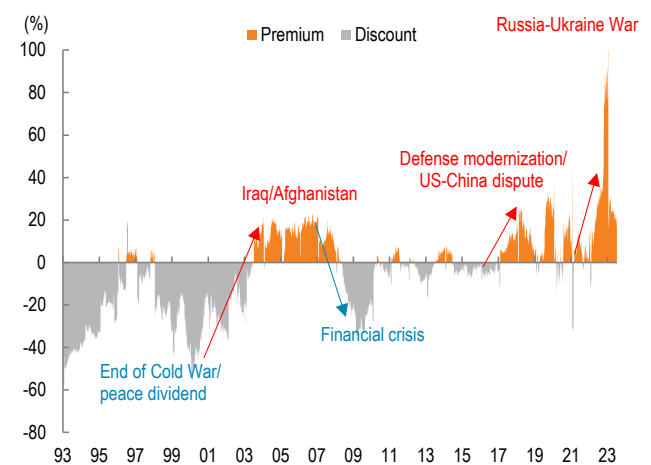
Note: Modernization account refers to procurement funds plus R&D spending.
Source: DoD, Mirae Asset Securities Research

Figure 44. Correlation between modernization account and market cap of major defense companies



Source: DoD, Bloomberg, Mirae Asset Securities Research

Figure 45. 12-month P/E premium of the defense/aerospace sector over the S&P 500

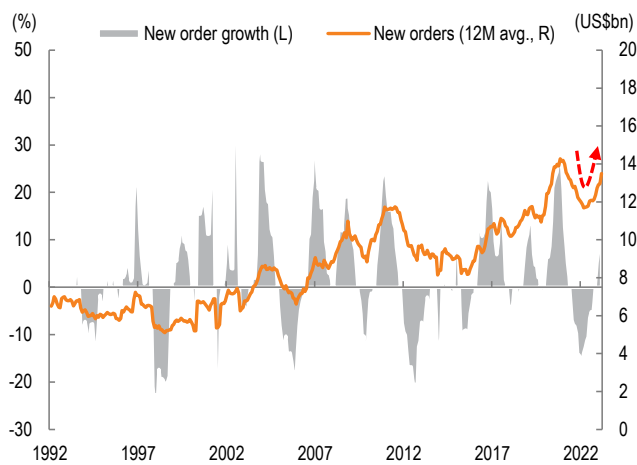


Source: Bloomberg, Mirae Asset Securities Research

Highlighting the strength of the defense cycle, US defense capital goods have been turning around in terms of new orders and growth in shipments/inventory. Lockheed Martin has seen its order backlog growth (YoY) rebound in the wake of the Russia-Ukraine War, driven by strong demand for its HIMARS and Javelin systems. In 2Q23, the company reported solid results, with revenue of US\$16.7bn (+8.1% YoY; 5.1% above the consensus) and EPS of US\$6.73 (+130% YoY; 4.6% above the consensus).

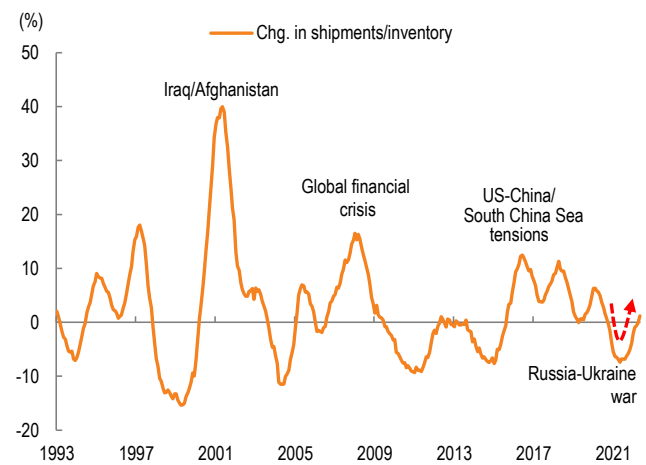
We believe the long-term growth trend of the defense industry will remain intact. The US is unlikely to structurally scale back its defense spending, as its support for Ukraine and move to strengthen its military capabilities in the Indo-Pacific region means it will need to internally produce/stockpile military equipment.

Figure 46. US defense capital goods: New orders



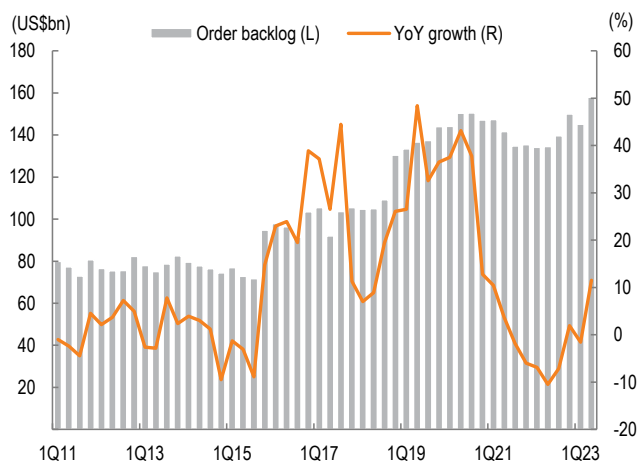
Note: Defense capital goods include aircraft, missiles, space vehicles/parts, ships/boats, GPS, and communications equipment.
Source: FRED, Mirae Asset Securities Research

Figure 47. US defense capital goods: Chg. in shipments/inventory



Note: Defense capital goods include aircraft, missiles, space vehicles/parts, ships/boats, GPS, and communications equipment.
Source: FRED, Mirae Asset Securities Research

Figure 48. Lockheed Martin's order backlog and YoY growth



Source: Lockheed Martin, Mirae Asset Securities Research

Figure 49. US greenlights Poland's HIMARS and ammunition purchases

US clears Poland to buy HIMARS, ATACMS, ammunition worth \$10 billion

By Joe Gould

Wednesday, Feb 8

[Facebook](#) [Twitter](#) [Reddit](#) [LinkedIn](#) [Email](#)



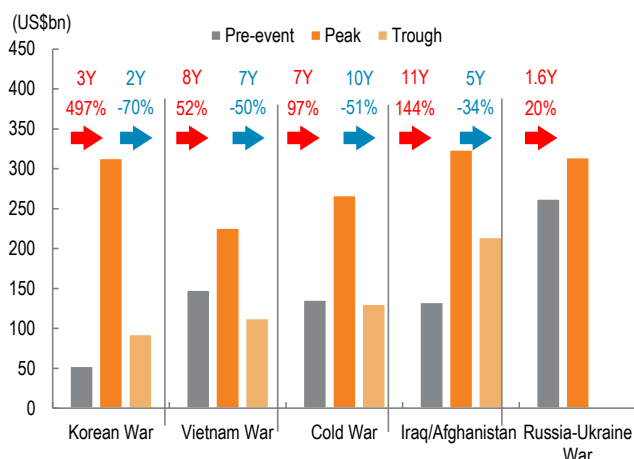
Source: Defense News, Mirae Asset Securities Research

Premature to worry about demand peaking

Any talk of a peak in defense demand seems premature at this point. Supply is still not meeting demand, which remains robust. Furthermore, wars have far-reaching and long-lasting impacts; during past military spending cycles, it took an average of seven to eight years for demand to reach a peak and another six years for it to hit a trough (based on an analysis of the military budgets of the top 15 defense spenders and the US defense modernization account). And the average growth rate from before the war to the peak was 198% (98% excluding the Korean War). An arms race has only begun.

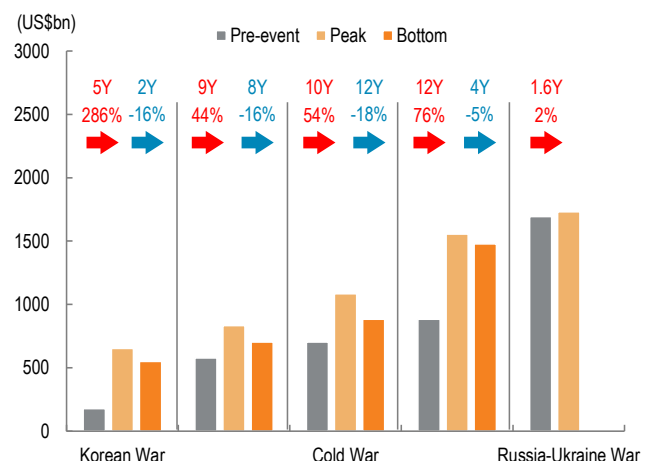
There are also signs of growing geopolitical risks in international media reports. The Geopolitical Risk (GPR) index, which is based on the share of news articles containing terms associated with adverse geopolitical events, is nearing levels seen during past destructive wars. The five-year moving average of the index has been a leading indicator of the US defense modernization account since 1950 and is currently at a record high (while the modernization account remains below its previous high).

Figure 50. Military budget of major defense spenders: Peaks and troughs



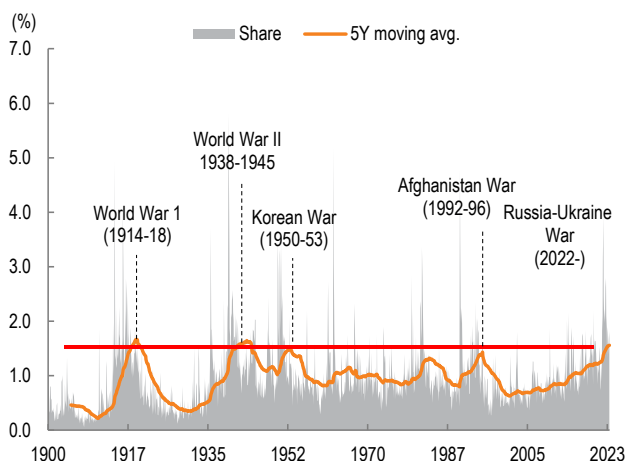
Source: SIPRI, Mirae Asset Securities Research

Figure 51. US defense modernization account: Peaks and troughs



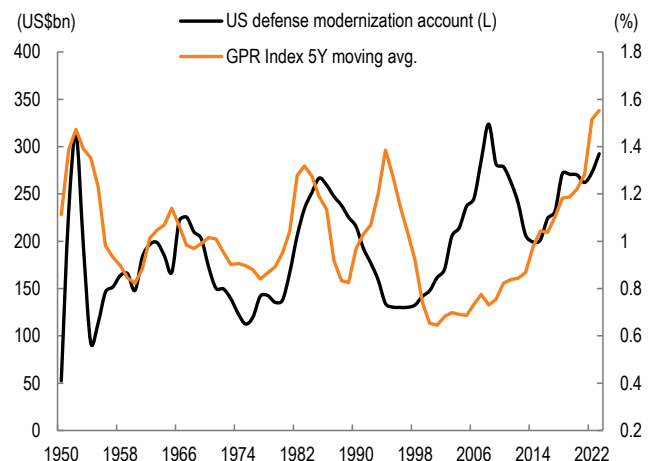
Source: DoD, Mirae Asset Securities Research

Figure 52. GPR index: Share of articles containing terms associated with adverse geopolitical events



Source: Matteo Iacoviello, Mirae Asset Securities Research

Figure 53. Correlation between 5Y moving average of GPR index and US defense modernization account



Source: Matteo Iacoviello, DoD, Mirae Asset Securities Research

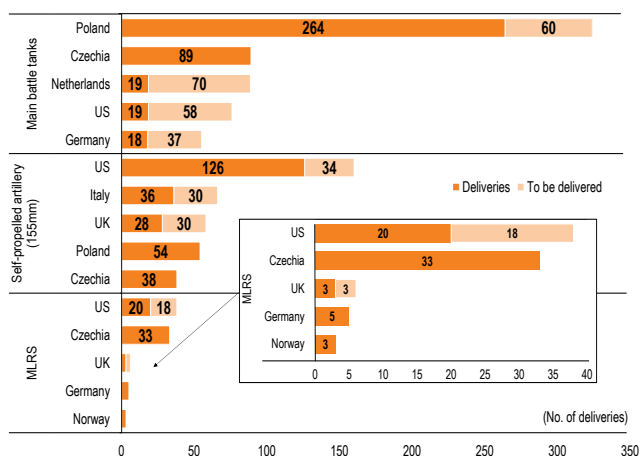
Stockpiles need replenishing

European countries are expecting security threats to persist over the long term, even after the Russia-Ukraine War comes to an end. In May 2022, the European Commission (EC) proposed: 1) replenishing military stockpiles (short-term goal); 2) replacing Soviet-era legacy systems with European solutions (medium/long-term goal); and 3) reinforcing air/missile defense systems. (long-term goal). This indicates that the current rise in defense investments is part of a secular trend rather than a one-off event.

Even if the war in Ukraine were to end right now, demand for weapons would likely remain high for at least another three to five years, given that countries need to replenish their exhausted military resources. European countries, in particular, are very likely to use the current situation as an opportunity to procure advanced NATO weaponry to replace their obsolete Soviet-era weapons.

Poland is a good example. After the country sent 23 Soviet-era fighter jets, 54 self-propelled artillery systems, and 264 main battle tanks to Ukraine, Korea filled the gap by supplying Poland with FA-50 light combat aircraft, K9 self-propelled howitzers, and K2 battle tanks. And neighboring countries like Romania, Slovakia, and the Czech Republic are also planning large-scale weapons procurement. We expect such efforts to be focused initially on conventional weapons (fighter jets, tanks, self-propelled artillery systems, missiles, ammunition, etc.).

Figure 54. Arms transfer (deliveries) to Ukraine by country



Source: Ukraine Support Tracker, Mirae Asset Securities Research

Figure 55. EC statement on defense investments

In light of the elevated security threat, and building on the coordinated analysis of the Commission and the EDA, the Commission and the High Representative propose to focus on the following most urgent capability gaps that can be addressed by the European defence industry:

1. **Replenish stockpiles:** Secure the combat readiness of armed forces and coordinate competing national demands, avoiding price spiralling and ensuring that most exposed countries have access to required capabilities.
2. **Replace:** Phase out existing Soviet era legacy systems still in use within EU Armed Forces with European solutions (such as: Main Battle Tanks, Armoured Fighting Vehicles, Infantry Fighting Vehicles, Armoured Personnel Carriers, heavy artillery, etc.), as part of a wider effort to augment existing capabilities and supporting interoperability and enhancing security of supply.
3. **Reinforce:** Strengthen the multilayer Air and Missile Defence systems of Member States, starting with mid-range systems in those most exposed. The defence of population areas, military forces and/or critical infrastructure against air and missiles threats is a critical challenge in the new security situation.

Beyond these urgent capability gaps, the Commission and the High Representative propose to work on the following strategic medium- to long-term capabilities to improve Europe's defence capabilities in the face of persistent threats:

Source: Europa, Mirae Asset Securities Research

Figure 56. Leopard 2 main battle tank



Source: BBC, Mirae Asset Securities Research

Figure 57. M1 Abrams main battle tank



Source: TASS, Mirae Asset Securities Research

Figure 58. M109 self-propelled howitzer



Source: Reuters, Mirae Asset Securities Research

Figure 59. MiG-29 fighter aircraft



Source: Defense News, Mirae Asset Securities Research

Figure 60. HIMARS: Light multiple rocket launcher



Source: DSM, Mirae Asset Securities Research

Figure 61. Javelin: Anti-tank weapon system



Source: BBC, Mirae Asset Securities Research

Geopolitical tensions remain elevated

We see no signs of global geopolitical tensions abating anytime soon. Tensions have been rising in the Indo-Pacific region, with Taiwan becoming a flashpoint between China and the US and territorial disputes around the South China Sea deepening; the situation could eventually trigger an arms race in the region. Furthermore, the US, Russia, and Taiwan are all set to hold presidential elections in 2024, which could fuel further political uncertainty and stock market volatility.

Notably, the number of Chinese fighter jets entering Taiwan's air defense zone has surged to a monthly average of 374 this year (vs. 81 in 2021), heightening tensions around the Taiwan Strait. Tensions are also high on the Korean peninsula, with North Korea launching 69 missiles in 2022 and 39 missiles so far this year.

The US is seeking to form military alliances in the Indo-Pacific region to brace for a potential armed conflict in the Taiwan Strait and to contain China's influence and military power in the region. In a rare move, the US agreed to sell nuclear submarines and missiles to Australia and to cooperate with India on the development and manufacturing of military platforms and hardware. Furthermore, to strengthen its naval power, the US is seeking to build warships in cooperation with allies. We expect such strategic partnerships in the Indo-Pacific region to accelerate going forward.

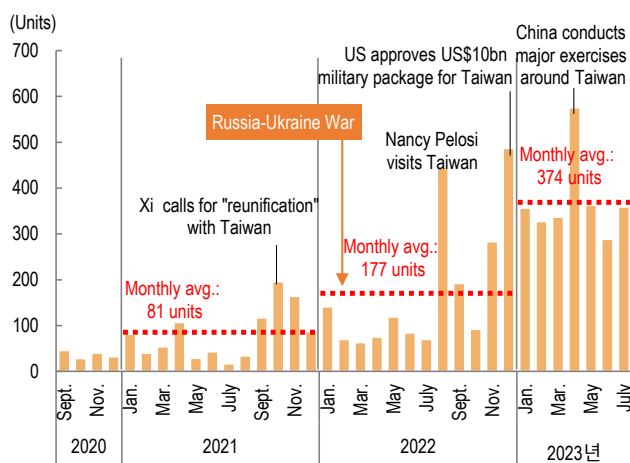
Table 4. Key geopolitical events in 2022-24

Geopolitical uncertainties to expand in 2024

	1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24
Russia-Ukraine War	Feb. 22											
Presidential election in US												Nov. 5
Presidential election in Russia									Mar. 17			
Presidential election in Taiwan									Jan. 13			

Source: Mirae Asset Securities Research

Figure 62. No. of Chinese fighter jets entering Taiwan's air defense zone



Source: Taiwan's Defense Ministry, Mirae Asset Securities Research

Figure 63. No. of North Korean missile launches



Source: NTI, Mirae Asset Securities Research

Amid the widening rift between China and the US, territorial disputes around the South China Sea have deepened, leading to increased imports of weapons by countries like the Philippines, Vietnam, Malaysia, and Indonesia. (Import volumes will likely be similar to or higher than the levels in 2014-18, when tensions were also high.)

The situation in the South China Sea has deteriorated, with China fully militarizing a number of the artificial islands it has built since 2013 (completing the construction of missile arsenals, aircraft hangars, radar systems, runways, etc.). Moreover, China's Coast Guard law—which took effect in Feb. 2021—has stoked further disputes over maritime jurisdiction, causing relations with neighboring countries to sour.

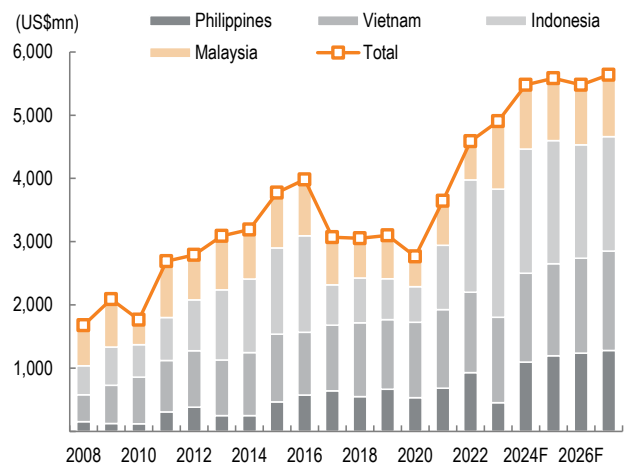
All in all, an arms race seems inevitable in the Indo-Pacific region. Given the heavy reliance of Southeast Asian countries and India on Soviet-era weapons, we think arms procurement projects will be divided into: 1) the procurement of readily deployable missiles, fighter jets, and battleships; and 2) modernization (i.e., replacement of obsolete Soviet-era weapons).

Figure 64. Chinese military facilities on artificial islands in the South China Sea



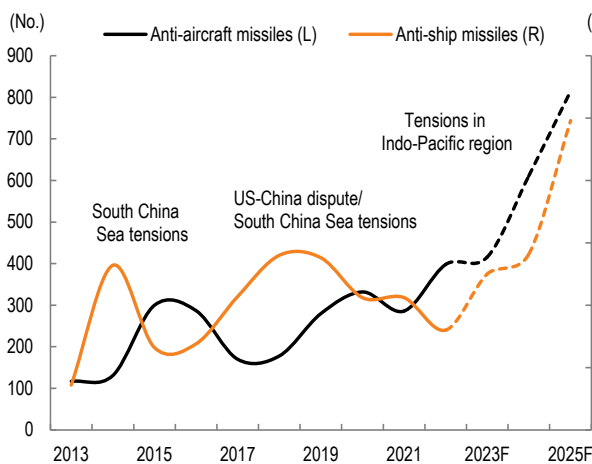
Source: Google Maps, Mirae Asset Securities Research

Figure 65. Arms procurement budgets of countries around the South China Sea



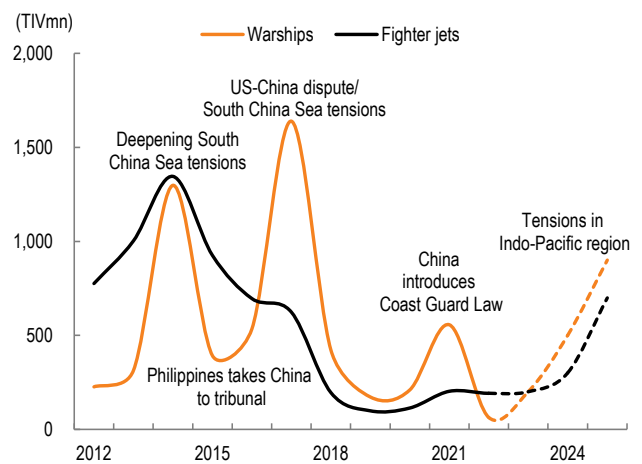
Source: Industry data, Mirae Asset Securities Research

Figure 66. Anti-aircraft/ship missile stockpiles of countries around the South China Sea



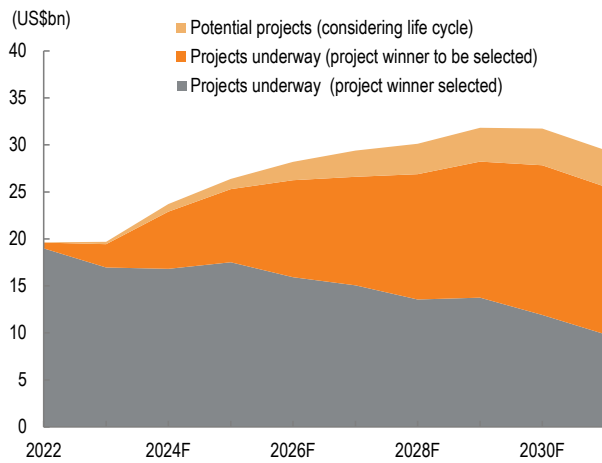
Source: SIPRI, Mirae Asset Securities Research

Figure 67. Warship/fighter jet imports of countries around the South China Sea



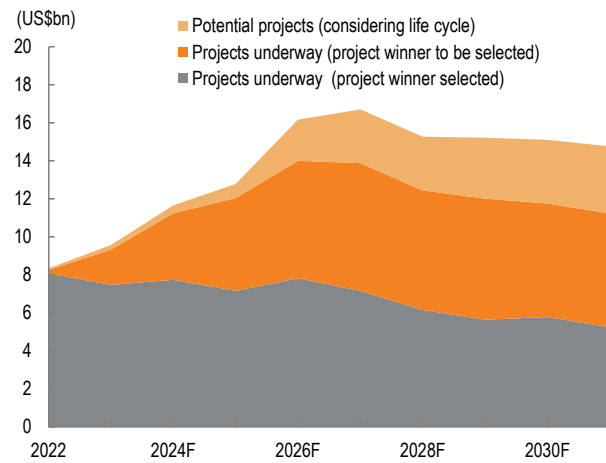
Source: SIPRI, Mirae Asset Securities Research

Figure 68. Australia: Potential demand for weapons



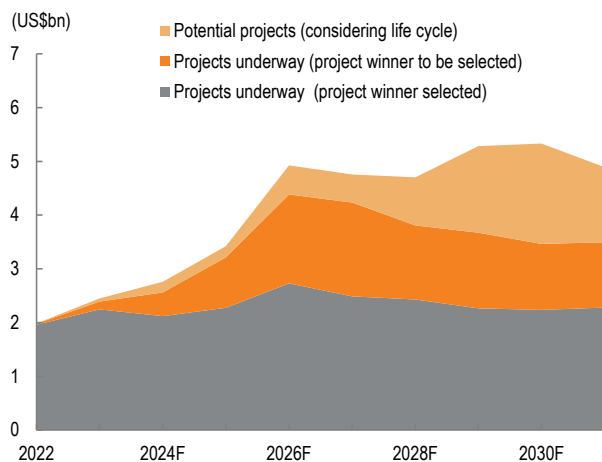
Source: Global Defense Market Yearbook 2022, Mirae Asset Securities Research

Figure 69. India: Potential demand for weapons



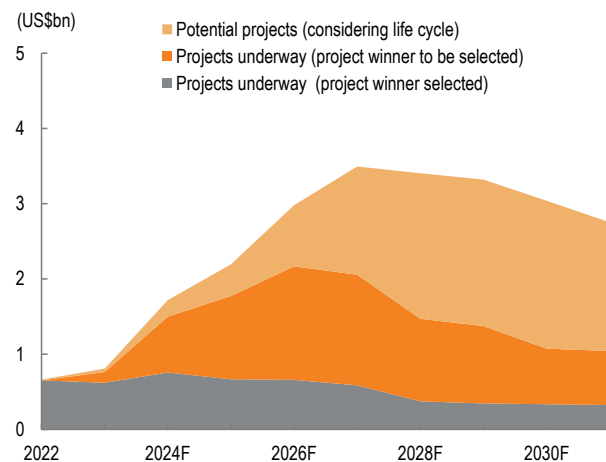
Source: Global Defense Market Yearbook 2022, Mirae Asset Securities Research

Figure 70. Indonesia: Potential demand for weapons



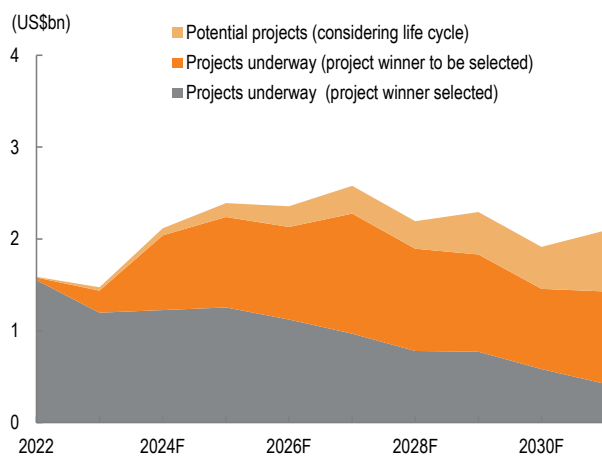
Source: Global Defense Market Yearbook 2022, Mirae Asset Securities Research

Figure 71. Vietnam: Potential demand for weapons



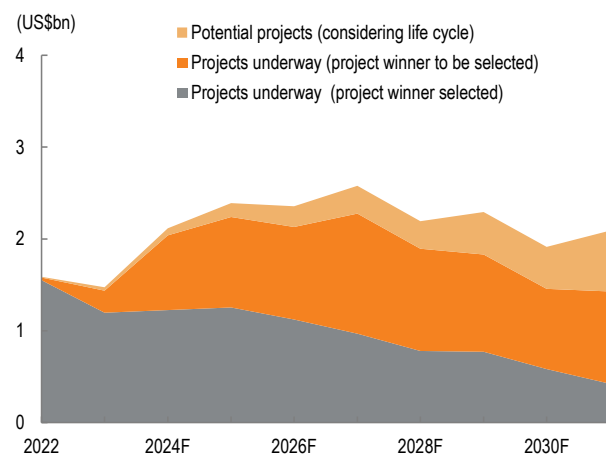
Source: Global Defense Market Yearbook 2022, Mirae Asset Securities Research

Figure 72. Philippines: Potential demand for weapons



Source: Global Defense Market Yearbook 2022, Mirae Asset Securities Research

Figure 73. Malaysia: Potential demand for weapons



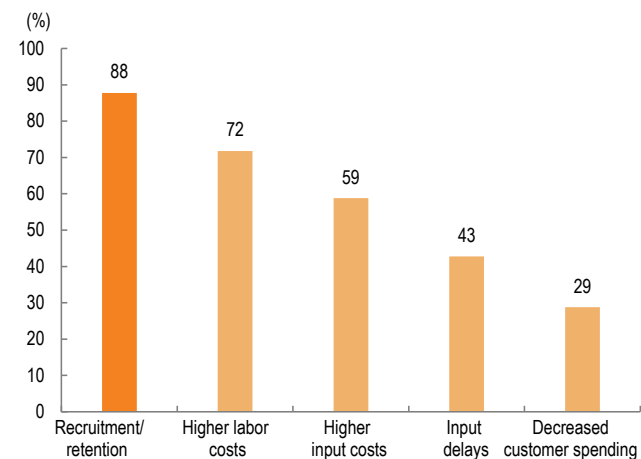
Source: Global Defense Market Yearbook 2022, Mirae Asset Securities Research

Paradigm shift in the defense market

In the past, advanced weapons were in high demand despite their high prices and longer delivery times. But now, a growing number of buyers prefer low/mid-priced, readily deployable weapons. Indeed, the most traded weapons are tanks, self-propelled artillery systems, and missiles. Lockheed Martin, for example, has been flooded with orders for Javelin anti-tank missile systems and HIMARS rocket systems. And even when it comes to advanced weaponry such as drones and satellite services, potential buyers are putting a high priority on price and efficiency.

The war in Ukraine is proving that a mix of advanced and conventional weapons is important in modern warfare. Thus, there is growing demand for cheap, readily deployable, and reliable weapons from countries seeking to bolster their national security. However, many countries are finding it difficult to meet their defense needs. In the US and Europe, years of disarmament, reduced production amid the pandemic, and worker shortages are preventing supply from keeping up with rising demand. According to a recent report by the National Defense Industrial Association (NDIA), the US defense workforce shrunk by 63% (from 3mn to 1.1mn) between 1985 and 2021, and over 88% of surveyed defense companies said they had difficulty finding/retaining skilled workers such as researchers and engineers.

Figure 74. Survey: Problems facing defense companies



Source: NDIA, Mirae Asset Securities Research

Figure 75. Difficulty finding defense workers by position



Source: NDIA, Mirae Asset Securities Research

Industry watchers now see supply issues in the US and Europe taking as long as six years to resolve. And faced with longer delivery times and increased prices (resulting from higher labor and raw material costs), a growing number of countries with limited budgets have been forced to turn to late market entrants for weapons procurement.

The Norwegian government recently ordered 54 new German-made Leopard 2A7 tanks. For the deal, we estimate the production lead time at nine years and price per unit at W47.2bn. Meanwhile, in 2022, the Polish government purchased 180 Korean-built K-2 tanks for W15bn per unit and with a lead time of only three years. As this example shows, procuring weapons from late market entrants (such as Korea) may be the more reasonable choice for countries under budgetary constraints and more immediate military threats. In reality, however, defense contracts tend to be influenced by numerous political factors (e.g., diplomatic/economic cooperation), making it difficult for late market entrants to make headway.

Figure 76. European defense firms face shortages of skilled workers and components as well as bureaucratic hurdles

Europe wants to re-power the region as a hub for defense industrial production. But the sector faces numerous hurdles. Along with limited supplies of skilled labor, contractors also face shortages of components and bureaucratic hurdles to secure permits. Some banks are reluctant to lend to the sector out of concern it could tarnish their ESG credentials, industry representatives, investors and NATO officials say.

Government bureaucracies need to restaff to vet and place orders and with complex items in particular, officials can't rush the process as they need to do a variety of assessments. In Germany, for instance, the defense ministry needs parliamentary approval for any order above €25 million, which would buy roughly 7,500 155mm artillery shells, according to calculations based on a Rheinmetall press release from 2022. That amount would last Ukraine less than a day given the rate of shelling by both sides in the conflict.

Source: Bloomberg, Mirae Asset Securities Research

Figure 77. Industry watchers say capacity ramp-ups will take several years

The reality, say many in the industry, is that even with more orders coming in and companies already expanding facilities, production in Europe will take years to match demand after the post-Cold War spending pull-back atrophied manufacturing and supply chain networks.

Görgen Johansson, head of Saab's Dynamics business area, said his business unit scaled up production last year and plans to double it, but the expansion will take two to three years. Only then will the company be able to return to pre-war delivery times. Expansion requires building factories, ordering machines and locking in supply chains, he said.

"We have already increased as much as possible right now," added Johansson, at the company's Karlskoga production facility. "It will take a couple of years to have full production at the levels the customers are looking for."

Source: Bloomberg, Mirae Asset Securities Research

Table 5. Germany's major defense export items: Actual lead times and unit prices

	Importer	Product name	Order volume (unit)	Year of order issuance	Delivery target	Lead time (years)	Unit price (Wbn)	Notes
Main battle tanks (MBT)	Italy	Leopard 2A8	133	2024	2037	14	42	New
	Norway	Leopard 2A7+	54	2023	2031	9	47	New
	Slovakia	Leopard 2A4	15	2022	2022	1	-	Used (free of charge)
	Hungary	Leopard 2A4	12	2018	2021	4	-	Used
		Leopard 2A7+	44	2018	2025	8	20	New
	Denmark	Leopard 2A7	16	2017	2021	5	-	Used (Enhanced/revamped)
	Netherlands	Leopard 2A6	18	2015	2018	4	-	Used (Enhanced/revamped)
	Poland	Leopard 2A4	14	2013	2014	2	-	Used
		Leopard 2A5	105	2013	2015	3	-	Used
	Qatar	Leopard 2A7+	62	2013	2018	6	51	New
	Indonesia	Leopard 2A4	61	2012	2017	6	-	Used (Enhanced/revamped)
		Leopard 2A4	42	2012	2015	4	-	Used
Self-propelled artillery	Singapore	Leopard 2A4	45	2012	2019	8	-	Used (Enhanced/revamped)
	Hungary	PzH 2000	24	2018	2025	8	9	New
	Lithuania	PzH 2000	18	2015	2022	8	-	Used (Enhanced/revamped)
	Croatia	PzH 2000	12	2014	2017	4	-	Used
	Qatar	PzH 2000	24	2013	2016	4	9	New

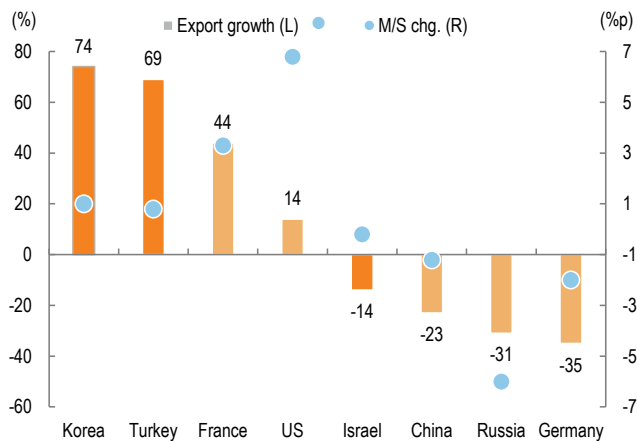
Note: For Leopard 2A8 tanks, delivery targets factor in the development period, and price per unit is calculated by dividing the contract value by the order volume.

Source: SIPRI, Mirae Asset Securities Research

Since the Russia-Ukraine war broke out in Feb. 2022, countries that nurtured their defense industries relatively late have outperformed market leaders (e.g., US) in terms of defense export value. Indeed, in 2022, weapons exports by Korea (US\$17bn; +134% YoY), Israel (US\$12.5bn; +10% YoY), and Turkey (US\$4.4bn; +36% YoY) reached all-time highs. These countries focus on exporting low/mid-end conventional weapons, and they have relatively short production lead times due to their higher capacity utilization rates.

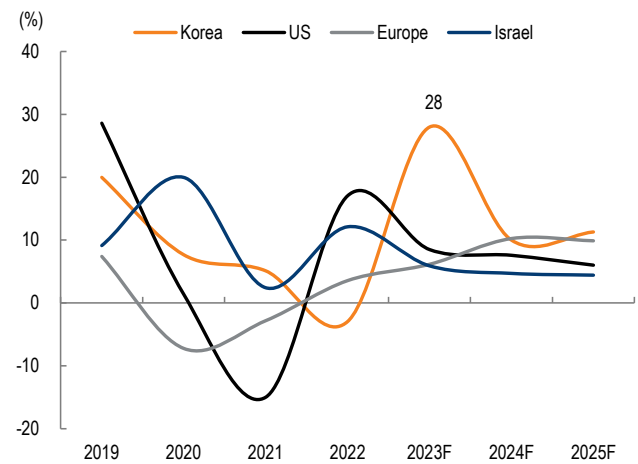
Since the start of the war in Ukraine, Korean defense stocks have posted a cumulative gain of 31%, outperforming their US, European, and Israeli counterparts. We see further upside ahead, given Korean defense stocks' attractive valuations (most undervalued among peers at a 12-month forward P/E of 11.6x) and higher revenue growth (+28% in 2023F).

Figure 78. Chg. in defense export growth and M/S of major countries



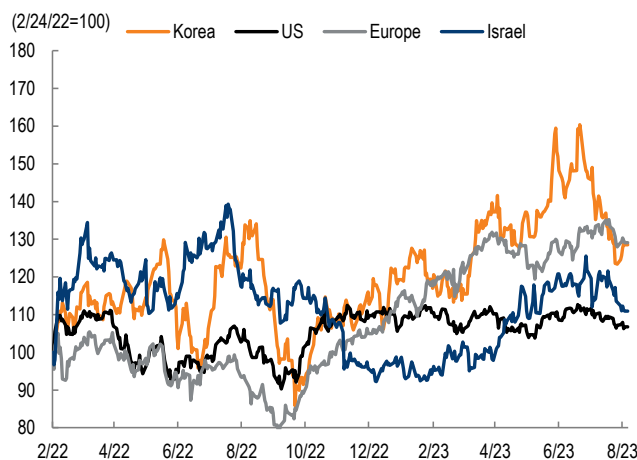
Note: Based on chg. between the 2013-17 and 2018-22 periods
Source: SIPRI, Mirae Asset Securities Research

Figure 79. Defense revenue growth in the US, Europe, Korea, and Israel



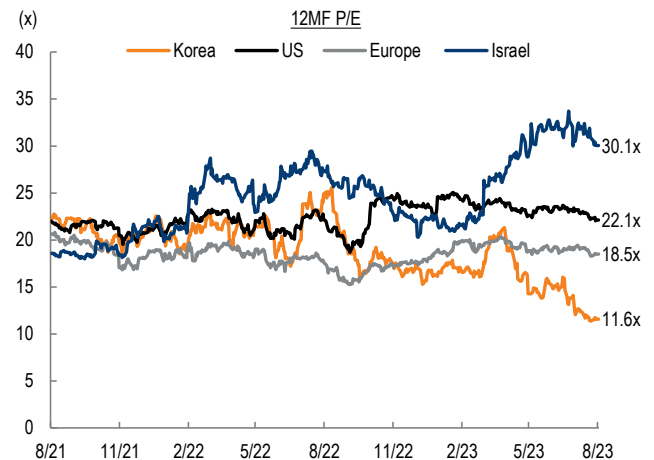
Source: FactSet, Mirae Asset Securities Research

Figure 80. Defense stock performance comparison: US, Europe, Korea, and Israel



Source: FactSet, Mirae Asset Securities Research

Figure 81. Defense stock valuation comparison: US, Europe, Korea, and Israel



Source: FactSet, Mirae Asset Securities Research

III. Growing appeal of Korean defense products

Unparalleled strategic value

We continue to recommend focusing on Korea's defense players. They have been able to cut costs through economies of scale (price competitiveness) while reducing production lead times by maintaining production, utilization, and employment levels even during periods of decreased military spending. They have also beefed up their technological capabilities through cooperation with market leaders (high quality and compatibility).

Korean defense firms' marketing strategy is centered on low/mid-end (cost-effective) products. Their mainstay export products—FA-50 jet trainers, K9 self-propelled howitzers, and K2 tanks—are 34% cheaper on average than competing models and have up to 10 years shorter lead times. In addition to offering the best value for money, Korean-made weapons are high-quality and designed to be compatible with NATO systems.

We expect the appeal of Korean defense products to continue to increase going forward. Compared with Korean players, Israeli and Turkish competitors have less diversified product portfolios and more limited trading partners (for political reasons). Of note, Korean players offer wide-ranging lineups encompassing fighter jets, battleships, ground firepower, guided weapons, and electronic warfare. We also expect Korean firms to benefit from US and European rivals' delayed capacity ramp-ups (which require not only new production lines but also the rebuilding of value chains with numerous suppliers).

Table 6. Pricing and lead times of Korea's major defense export items (vs. competing models)

	Model	Producer	Unit price (US\$m)	Maintenance cost (US\$m)	Total cost per unit (US\$m)	Order volume (Units)	Production capacity (Units/year)	Expected lead time (No. of years)	Total production volume	Economies of scale
Light fighters	FA-50 (Korea)	KAI	29.6	60.4	90.0	94	36 (72)	3 (1)	208	○
	F-16 (US)	Lockheed Martin	75.6	154.0	229.6	190	48	4	2,810	○
	Gripen (Sweden)	Saab	72.0	146.7	218.7	73	24	3	163	X
	M-346FA (Italy)	Leonardo	50.0	101.9	151.9	38	15	3	92	X
	Tejas Mk1 (India)	Hindustan	44.0	89.6	133.6	99	16	6	41	X
Self-propelled artillery	K9 (Korea)	Hanwha Aerospace	7.3	14.9	22.2	426	80 (240)	5 (2)	1,416	○
	PzH 2000 (Germany)	KMW/Rheinmetall	7.4	15.1	22.6	142	12	12	82	X
	M109A7 (US)	BAE Systems	18.4	37.5	56.0	1,072	96	11	2,086	○
	Caesar (France)	Nextor	5.8	11.9	17.8	258	24 (72)	11 (4)	227	X
Tanks	K2 (Korea)	Hyundai Rotem	10.3	21.0	31.3	356	60	6	221	X
	Leopard 2 (Germany)	KMW/Rheinmetall	13.3	27.0	40.3	307	10 (70)	31 (4)	1,702	X*
	M1A2 (US)	General Dynamics	13.7	27.8	41.5	1,393	144	10	3,375	○
	Altay (Turkey)	BMC/Hyundai Rotem	10.0	20.3	30.3	1,100	96	11	160	X

Notes: For production capacity, numbers in parentheses reflect the capacity ramp-ups slated for completion in 2024; price per unit is calculated based on the latest avg. price of new products and includes only the cost of airframe production or contracts that include maximum training/repair part costs (excl. package contracts that include other products); order backlog and production volume figures include products in the same series; for Leopard 2 tanks, the number of units in operation exceeds 1,000, but scale effects are not expected due to a marked reduction in production volume and the discontinued production of parts (following years of disarmament by Germany).

Source: World Air Forces 2023, Janes, media reports, Mirae Asset Securities Research

Expanding into the global market

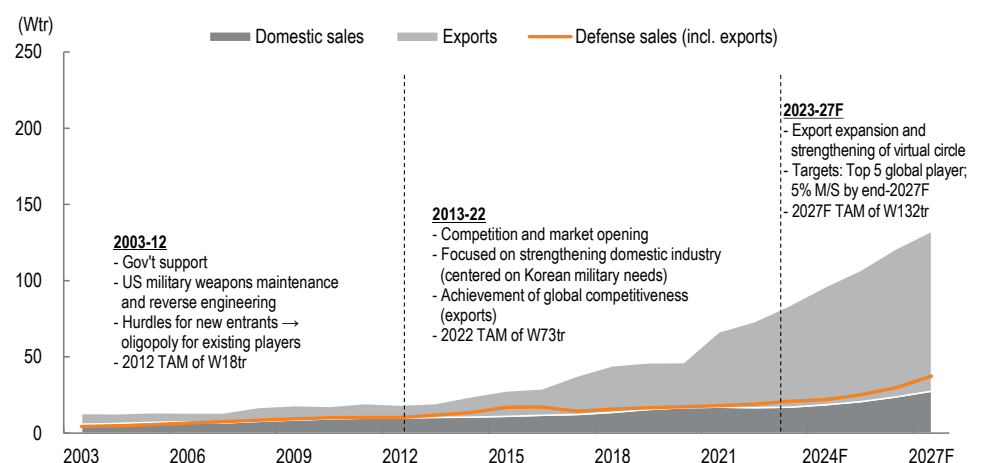
We expect the total addressable market (TAM) for Korea's defense industry to expand to W132tr by 2027, aided by simultaneous growth in domestic sales and exports. From 2023 to 2027, we estimate that the addressable domestic and export markets will grow at CAGRs of 12.7% and 12% to W27tr and W105tr, respectively. Domestic market growth will likely be driven by increased defense enhancement spending, while export market growth should be driven by an increase in the number of export destinations.

From 2023 to 2027, we estimate that Korean defense firms' combined domestic revenue will grow at a CAGR of 13.3% to W27tr. The combined value of major projects that have become visible—KF-21/LAH production, the fourth round of K2 tank production, K9 improvement, L-SAM system development, M-SAM production, etc.—stands at around W30tr. Moreover, in the long term, we expect discussions on projects such as manned-unmanned teaming (MUM-T), LAMD, aircraft carriers, and localization of aircraft engines to get underway. As such, we see upside risks to our domestic annual revenue estimate.

Meanwhile, we estimate defense exports will grow at a CAGR of 23% to W10.6tr (28% of total revenue). Given defense companies' schedules, we expect the export contribution to surge in 2023 as deliveries of "gap filler" volume to Poland materialize. Exports will likely decline slightly in 2024. From 2025, however, we expect to see steady growth in both export revenue and profits, backed by deliveries of the remaining gap filler volume and additional orders.

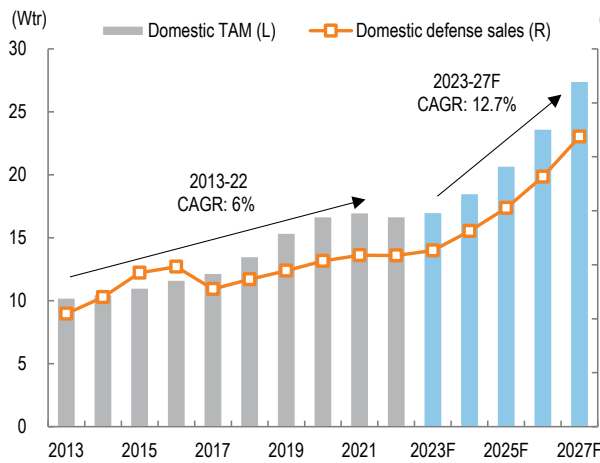
Of note, Korea's defense industry appears to have higher growth potential than developed countries' industries. Indeed, defense budget spending in Korea is forecast to display cumulative growth of 96.5% from 2007 to 2027, higher than the rates in the US, the UK, France, Italy, and Germany. And while Korea has ranked no. 2 in terms of defense spending as a percentage of GDP (behind only the US), it is expected to overtake the US by 2027.

Figure 82. Est. TAM for Korea's defense industry: Domestic sales and exports



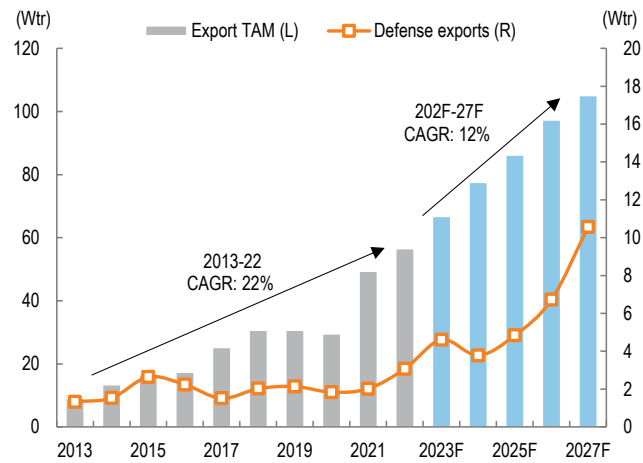
Source: Defense Acquisition Program Administration, national defense budgets, KIET, Mirae Asset Securities Research estimates

Figure 83. Domestic market outlook



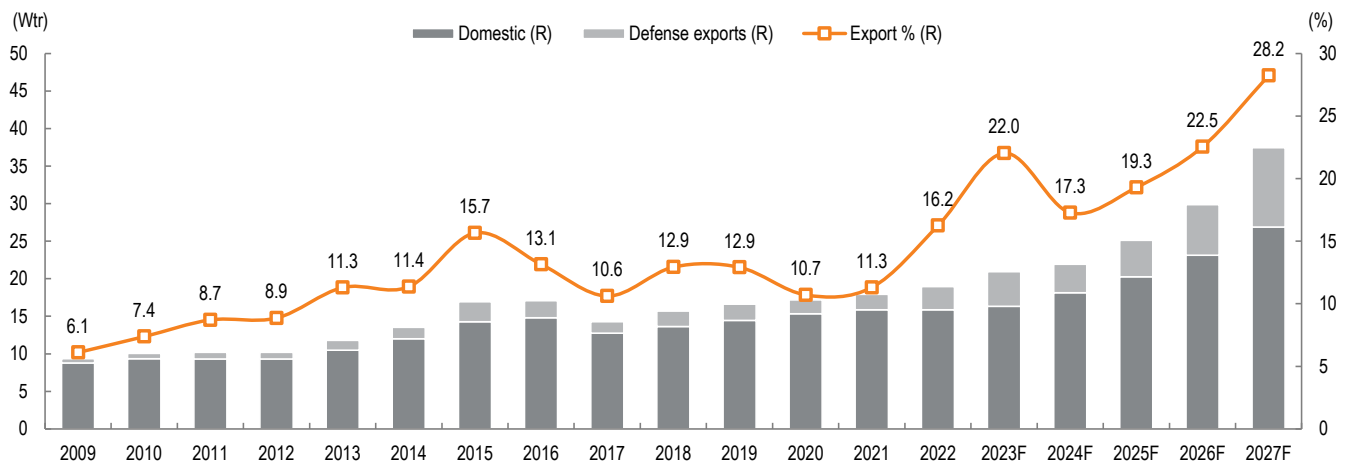
Source: Defense Acquisition Program Administration, KIET, Mirae Asset Securities Research estimates

Figure 84. Export market outlook



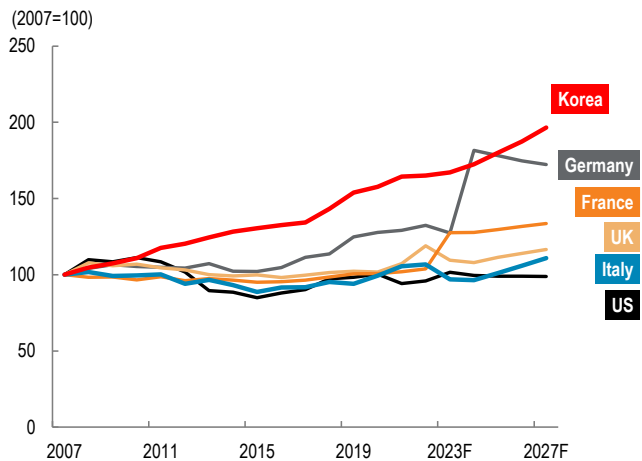
Source: Each country's defense budget, KIET, Mirae Asset Securities Research estimates

Figure 85. Defense revenue breakdown (domestic revenue and exports) and export contribution



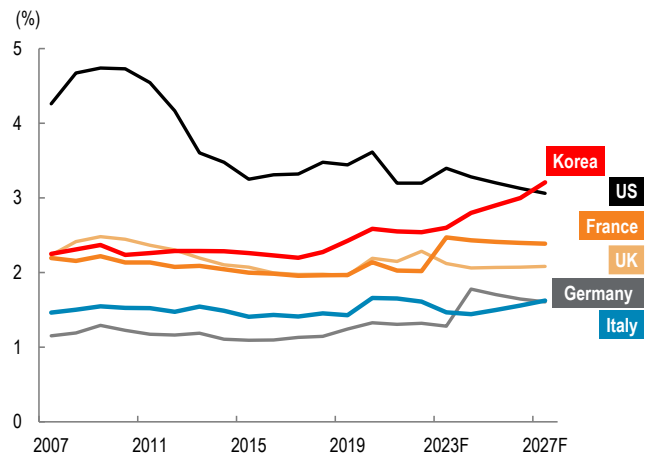
Source: Defense Acquisition Program Administration, Each country's defense budget, KIET, Mirae Asset Securities Research

Figure 86. Cumulative growth of defense budget spending: Korea vs. major Western countries



Source: SIPRI, industry data, Mirae Asset Securities Research

Figure 87. Defense budget as % of GDP: Korea vs. major Western countries



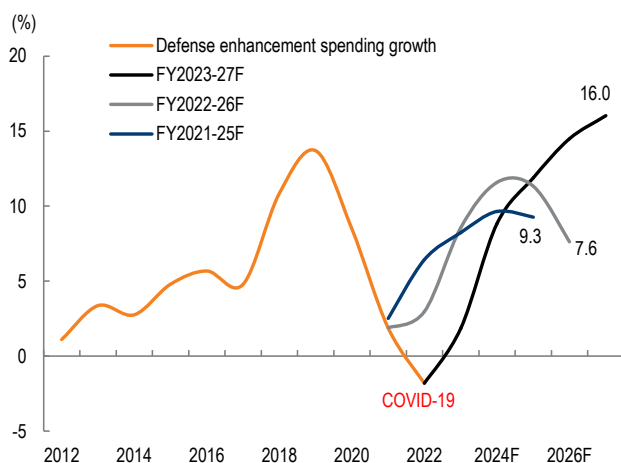
Source: SIPRI, industry data, Mirae Asset Securities Research

Domestic: Revenue to grow on increased defense enhancement spending

According to the Ministry of National Defense's medium-term defense plan (2023-27), defense spending over the next five years will total W331.4tr, of which defense enhancement spending will amount to W107.4tr—equivalent to an annual average expenditure of W36tr (CAGR of 12.7%). Under the plan, defense enhancement expenses as a percentage of the defense budget will reach 36.1% in 2027, exceeding the past 10-year average of 30.9%.

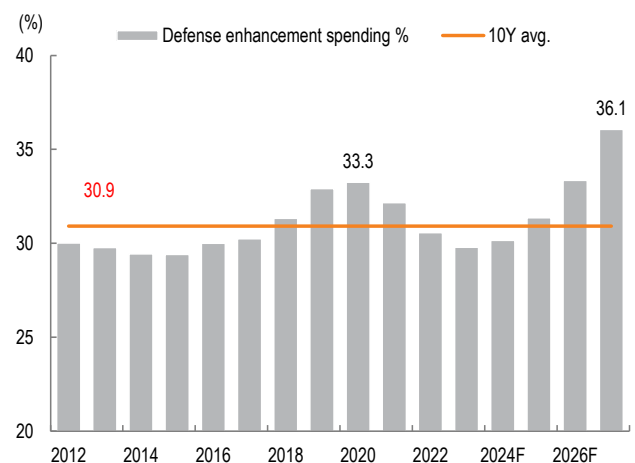
In Korea, the correlation between the defense budget and defense firms' revenue is 0.92—higher than in the US and Europe. This suggests that the government's increased defense enhancement spending targets will translate into domestic revenue growth for defense companies. During periods when defense enhancement spending as a share of the defense budget rises, defense companies typically win orders for projects to develop and produce new weapon systems. And given that full revenue recognition takes at least two to three years, top-line growth usually materializes after the share of defense enhancement spending comes back down.

Figure 88. YoY growth of defense enhancement spending targets: FY2021-25 vs. FY2022-26 vs. FY2023-27



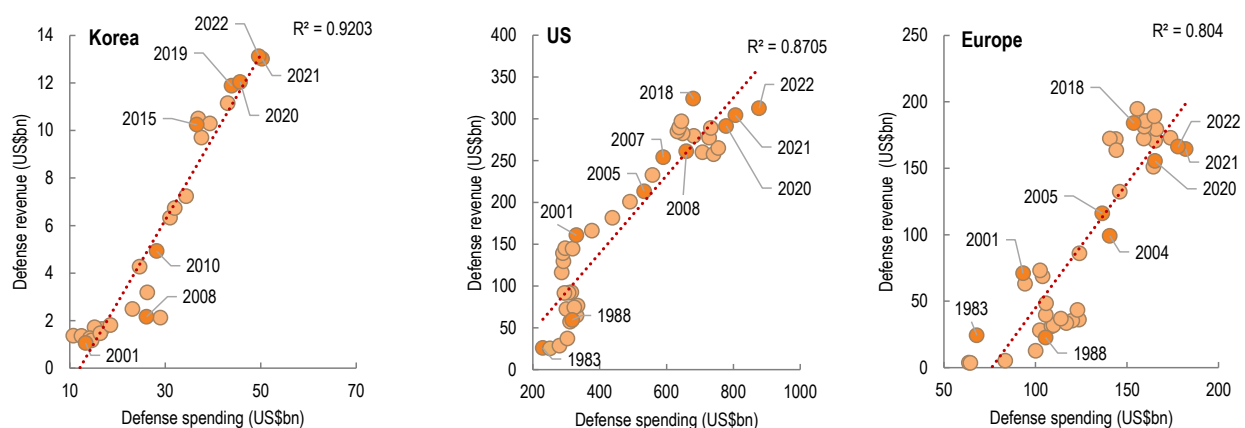
Source: Defense Acquisition Program Administration, Mirae Asset Securities Research

Figure 89. Defense enhancement spending as % of defense budget



Source: Defense Acquisition Program Administration, Mirae Asset Securities Research

Figure 90. Correlation between defense budget and defense companies' revenue: Korea, the US, and Europe



Source: SIPRI, Mirae Asset Securities Research

Korea's defense enhancement programs are focused on establishing the so-called "3K" system, which consists of the Kill Chain preemptive strike system, the Korean Air and Missile Defense (KAMD) project, and the Korea Massive Punishment and Retaliation (KMPR) plan. The strategy is designed to counter North Korea, whose provocations (missile launches and military exercises) have increased in intensity and frequency following Russia's invasion of Ukraine. Missile defense and strike systems, airpower, surveillance/reconnaissance, and command/control form the core of the strategy.

Two companies likely to see domestic revenue growth in relation to these programs are LIG Nex1 and KAI. Indeed, based on plans cleared by the Defense Program Promotion Committee, which reviews major defense program policies and funding, LIG Nex1 and KAI have been the biggest recipients of funding in 2022-23, accounting for 32.6% and 27.3% (or 49% when including the KF-21 mass production contract), respectively.

Notably, most of the large-scale defense programs cleared by the committee are mass production projects, which have higher margins. LIG Nex1 will be participating in the L-SAM (W2.7tr) and Cheongung block 3 (W2.8tr) mass production projects, while KAI will be involved in mass producing the KF-21 (contract expected in 2024; estimated value of W12tr) and light armed helicopters (W5.7tr). We also expect Hanwha Aerospace and Hanwha Systems to benefit by supplying some of the parts for these programs, including warheads, rockets, and active electronically scanned array (AESA) radars.

Table 7. MND's major defense enhancement programs and related companies

Program	Details	Relevant companies
Securing Kill Chain capabilities	- Additional procurement of advanced stealth fighter jets - Korean tactical surface-to-surface missile (KTSSM) deployment - Additional procurement of mid-sized submarines equipped with submarine-launched ballistic missiles (SLBMs)	LIG Nex1, Hyundai Heavy Industries (HHI), Hanwha Ocean
KAMD	- Strengthen omni-directional detection of ballistic missiles, including SLBMs - Continuously secure multi-layer defense capabilities that can counter increasingly advanced ballistic missile threats - Research and secure core technology for low-altitude missile defense systems	LIG Nex1
Strengthening KMPR capabilities	- Develop high-power/high-precision long-range missile systems - Reinforce special mission brigades and strengthen core facility targeting capabilities - Enhance C-130H and UH-60 performance	LIG Nex1, Hanwha Aerospace
Strengthening surveillance/reconnaissance and command/control systems	- Strengthen surveillance of core aerial targets on the Korean peninsula - Advance capabilities to collect signal intelligence on adversaries' communication equipment	LIG Nex1, Hanwha Systems
Improving quality of ground forces	- Continuously develop/produce K2 battle tanks, wheeled armored personnel carriers, and medium tactical vehicles - Deploy additional 230mm multiple launch rocket systems, deploy counter-battery radar II, and develop additional division-level counter-battery radars	Hanwha Aerospace, Hyundai Rotem, LIG Nex1
Improving amphibious/landing operation capabilities	- Deploy new 2,800-tonne frigates - Deploy additional 3,200-tonne frigates - Strengthen warfare capabilities of Navy fleet - Continuously advance division-level, multi-dimensional, high-speed landing capabilities	HHI, Hanwha Ocean
Advancing airpower	- Upgrade performance of F-15K and KF-16 fighter jets - Replace old fighter jets following completion of KF-21 development	KAI, Hanwha Aerospace, Hanwha Systems
Strengthening surveillance via unmanned aerial vehicles (UAVs)	- Secure UAVs suitable for military (mid-altitude UAVs, army corps-level UAVs, etc.) - Expand communication network of tactical units and improve data relay capabilities by securing telecommunications relay drones - Expand AI-based manned/unmanned teaming forces	KAI, Hanwha Aerospace, LIG Nex1, Hanwha Systems, Korean Air, etc.

Source: "2023-27 Medium-Term Defense Plan," Mirae Asset Securities Research

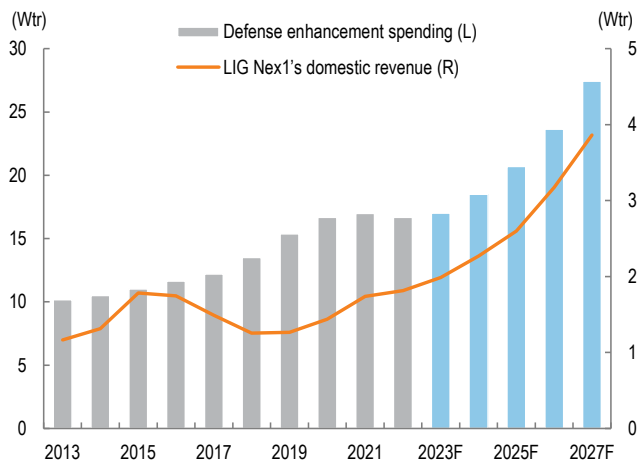
Table 8. Summary of Defense Program Promotion Committee's 2022-23 results

Disclosure date	Program name	Company	Start	End	Program duration (years)	Total spending (Wbn)	Annual avg. spending	Program type
Jun. 26, 2023	K9 self-propelled howitzer second upgrade (block 1)	Hanwha Aerospace	2023	2034	11	2,360	215	System development
May 25, 2023	K2 battle tank mass production	Hyundai Rotem	2024	2028	4	1,940	485	Mass production
Apr. 25, 2023	L-SAM-II	LIG Nex1	2024	2035	11	2,710	246	Mass production
Apr. 25, 2023	M-SAM block 3	LIG Nex1	2024	2034	10	2,830	283	Mass production
Apr. 13, 2023	Ship-to-surface missile	LIG Nex1	2024	2036	12	610	51	R&D
Mar. 14, 2023	UAVs for surveillance on destroyers/UAVs for northwest islands	Korean Air	2023	2031	8	550	69	R&D
Mar. 14, 2023	Ship-to-air guided missile II	LIG Nex1	2023	2030	7	690	99	System development/ mass production
Mar. 14, 2023	KTSSM-II	Hanwha Aerospace	2023	2032	9	1,550	172	System development
Dec. 28, 2022	KDX-II upgrade	Hanwha Ocean	2024	2033	9	673	75	Upgrade
Dec. 28, 2022	Second AOE-II	HHI	2024	2028	4	420	105	R&D
Nov. 28, 2022	130mm guided rocket II	LIG Nex1	2022	2033	11	380	35	System development
Nov. 28, 2022	155mm precision guided projectile	Hanwha Aerospace	2024	2036	12	440	37	R&D
Nov. 28, 2022	Light armed helicopters	KAI	2022	2031	9	5,700	633	Mass production
Jul. 15, 2022	SATURN upgrade	KAI	2022	2028	6	1,340	223	Upgrade (mass production)
Jul. 15, 2022	K9 self-propelled howitzer second upgrade (block 1)	Hanwha Aerospace	2023	2034	11	2,360	215	Upgrade (mass production)
May 31, 2022	Wheeled command vehicles	Hyundai Rotem	2022	2029	7	1,500	214	Mass production
May 30, 2022	Minesweeping helicopters	KAI	2022	2030	8	970	121	System development
May 30, 2022	Naval electronic warfare equipment II	LIG Nex1	2022	2036	14	720	51	System development
Mar. 25, 2022	Long-range air-launched cruise missile II	LIG Nex1	2018	2028	10	230	23	System development
Mar. 25, 2022	Ship-to-air guided missile II	LIG Nex1	2023	2036	13	690	53	System development/ mass production
Mar. 25, 2022	Cheolmae II upgrades	LIG Nex1	2023	2029	6	720	120	Upgrade (mass production)

Note: Highlights denote large domestic projects worth over W1tr.

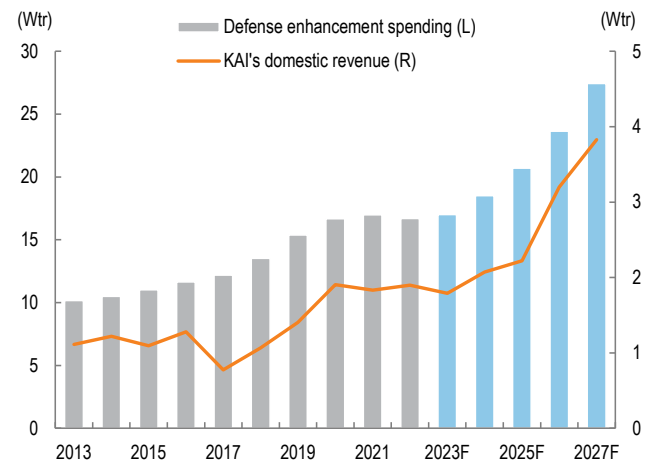
Source: DAPA, Mirae Asset Securities Research

Figure 91. LIG Nex1's domestic revenue and Korea's defense enhancement spending



Source: LIG Nex1, Mirae Asset Securities Research

Figure 92. KAI's domestic revenue and Korea's defense enhancement spending



Source: KAI, Mirae Asset Securities Research

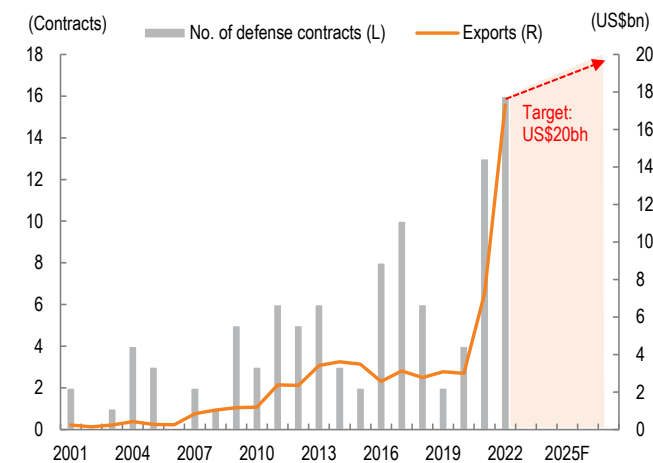
Defense exports: Going global

In 2022, Korea's defense exports (based on contract wins) surged 139% YoY to a record US\$17.3bn. This marked the first time defense exports have more than doubled for two straight years. If this trend continues, defense exports (customs clearance basis) are likely to climb to W10.5tr by 2027 (36.3% CAGR), according to a forecast by the Korea Institute for Industrial Economics & Trade (KIET).

Over the past two decades, Korea's defense export destinations have increased roughly sixfold from five countries to 31 countries (cumulative). And while export destinations were previously focused on Southeast Asia, the Middle East, and Latin America, we expect more European countries to join the list following the conclusion of massive deals with Poland.

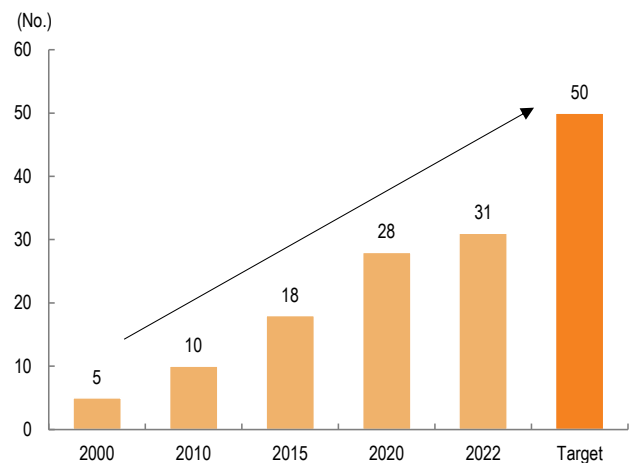
Notably, the Korean government has set a goal to become one of the world's four largest defense exporters. We think the government's active support bodes well for the future of defense exports (given that these are government-to-government transactions).

Figure 93. Korea's defense contracts and exports



Source: DAPA, SIPRI, Mirae Asset Securities Research

Figure 94. Korea's defense export destinations (cumulative)



Source: SIPRI, Mirae Asset Securities Research

Export momentum remains strong. So far this year, we estimate Korea's defense exports (based on contract wins) at US\$13bn, including the second round of exports to Poland. Moreover, around 30 potential export deals have been reported in the press; the actual number could be higher, as embargoes are not uncommon in the defense industry.

Countries expected to place large-scale orders include Romania, Saudi Arabia, and Egypt. In particular, Romania has allocated US\$2.8bn to weapons procurement this year and seems very likely to import Korean weapons, given its similarities to Poland (in terms of geography and weapons systems). Meanwhile, we see potential aircraft demand from Egypt (light fighter jets) and the US (jet trainers). Moreover, Saudi Arabia and Malaysia could order missile defense systems, and Canada has plans to introduce 12 submarines.

Table 9. Potential weapons exports by item

(US\$mn)

Product (company)	Country	Stage	Contract date	Expected value	No. of units	Expected price
T-50 advanced jet trainer/ FA-50 light fighter jet (KAI)	Egypt	RFP submitted	2024	3,200	100	32
	Slovakia	RFP submitted	2024	500	10	50
	US Air Force (TSA)	RFI issued	2024	1,651	64	26
	US Navy (UJTS)	RFI issued	2026	3,741	145	26
	US Air Force (ATT)	RFI issued	TBD	3,302	128	26
	Philippines	Under discussion	TBD	600	12	50
	Colombia	Final selection	TBD	600	20	30
	Ireland	Expression of interest	TBD	360	12	30
	Romania	Expression of interest	TBD	450	15	30
K9 self-propelled howitzers (Hanwha)	Australia	RFI issued	2027	2,500	34	74
	Poland (2-1)	In negotiation	2023	2,500	100	25
	India	RFI issued	2023	650	100	6.5
	Romania (1 st)	MOU	TBD	1,158	54	21
	UK	RFP submitted	2025	1,000	116	8.6
	Romania (2 nd)	MOU	TBD	765	46	17
K2 tank (Hyundai Rotem)	Vietnam	Expression of interest	TBD	702	108	6.5
	Poland (2-1)	In negotiation	2023	5,500	180	31
	Romania	Expression of interest	TBD	4,050	300	14
	Oman	Awaiting contract	TBD	885	76	12
	Egypt	Under discussion	TBD	TBD	TBD	TBD
Chunmoo rocket artillery system (Hanwha)	Poland (2-1)	In negotiation	2023	1,000	70	14
	Romania	MOU	TBD	TBD	TBD	TBD
KM-SAM II (LIG Nex1)	Saudi Arabia	Under discussion	TBD	TBD	TBD	TBD
	Malaysia	RFI issued	TBD	TBD	TBD	TBD
Redback IFVs (Hanwha)	Australia	Final selection	2023	1,560	129	12
	Romania	Expression of interest	TBD	3,193	264	12
	Brazil	Expression of interest	TBD	943	78	12
K-30 SAM (Hanwha)	Saudi Arabia	MOU	TBD	3,772	92	41
	India	RFI issued	TBD	3,000	104	29
Submarines (Hanwha Ocean, HD Hyundai Heavy Industries)	Canada	RFI issued	TBD	60,000	12	5,000
	Philippines	In negotiation	TBD	1,500	2	750
	Poland	RFI issued	TBD	2,460	3	820

Notes: Shaded areas indicate orders that are likely to be placed; in cases where the contract value is unclear, value was estimated based on the volume and previous/avg. unit prices.

Source: Media reports, Mirae Asset Securities Research

Opportunities in the global market

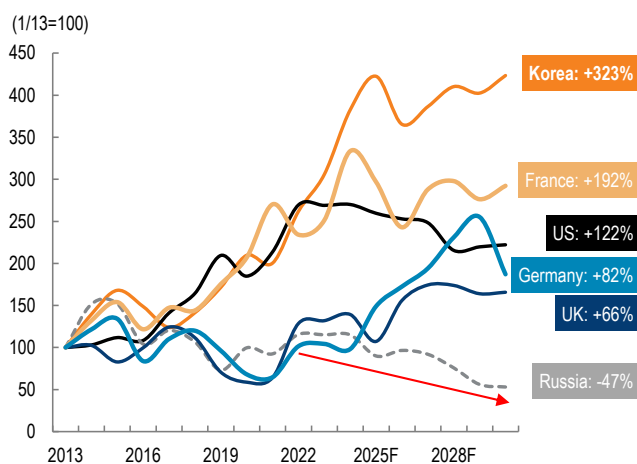
The global defense industry is undergoing seismic changes, triggered by: 1) the rearmament of developed economies (Europe, Japan, etc.); 2) the replacement of Soviet-era weapons; and 3) the flare-up of US-China tensions in the Indo-Pacific region. As supply chains become reorganized in response to soaring defense demand, Korean defense companies may find major opportunities to expand their global presence.

While demand for conventional weapons is growing globally, weapons developers in the US, the UK, France, and Germany will likely remain focused on existing demand and/or domestic sales for the time being. US defense companies are unlikely to channel resources to conventional weapons, as demand for advanced weaponry (their main focus) remains strong. And defense companies in the UK, France, and Germany are struggling to rebuild their workforce, production lines, and value chains and thus will need more time to secure enough stock for exports. Moreover, Russia should rapidly lose ground, as its weapons are being driven out of the global defense market.

On the other hand, Korea is well-positioned to increase its defense exports. Since the war in Ukraine broke out, Korean defense companies have built an export track record and demonstrated competitiveness in terms of product portfolio, price, delivery time, quality, compatibility, local production, technology transfer, political neutrality, etc. Based on Korean defense companies' current order backlog, total revenue from the sale of conventional weapons (fighter jets, main battle tanks, and self-propelled artillery systems) is projected to surge 323% (cumulative) by 2030, with export revenue forecast to grow 166% by 2025.

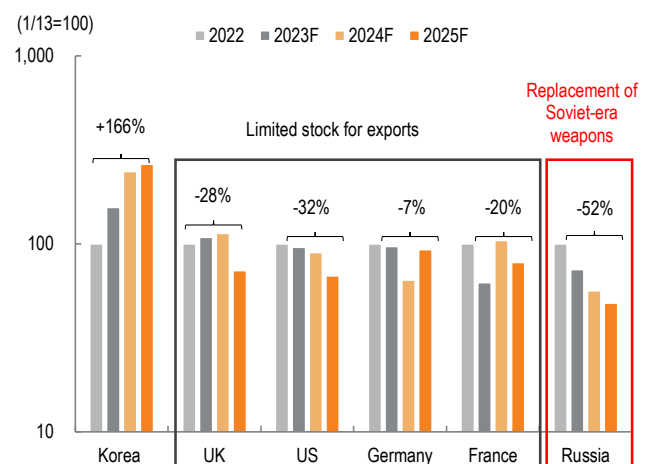
To sustain growth, Korean defense companies will need to aggressively expand their global footprint. Based on their experience exporting to Poland, we expect them to extend their reach to other Eastern European counties that still rely heavily on Soviet-era weapons, such as Romania, Slovakia, the Czech Republic, and Hungary. After that, they should be well-positioned to export to other parts of the world that have long used Russian weapons, such as Southeast Asia, the Middle East, and Africa.

Figure 95. Projected growth in revenue from the sale of conventional weapons



Note: Combined revenue from the domestic sale/export of fighter jets, main battle tanks, and self-propelled artillery systems based on the current order backlog
Source: Janes, Mirae Asset Securities Research

Figure 96. Projected growth in revenue from the export of conventional weapons



Note: Combined revenue from exports of fighter jets, main battle tanks, and self-propelled artillery systems based on the current order backlog
Source: Janes, Mirae Asset Securities Research

Export opportunity (1): Europe

As the Russian-Ukraine war drags on, demand for conventional weapons (fighter jets, main battle tanks, self-propelled artillery systems, anti-tank missiles, multiple rocket launcher systems, missile defense systems, etc.) should increase in Europe. With many countries having just started to replace their Soviet-era weapons, we see ample upside to demand. Against this backdrop, Korea is likely to enjoy additional defense export momentum. Exports to Poland have raised interest in made-in-Korea weapons, which are increasingly seen as an attractive alternative to US and German weaponry due to their lower prices and shorter lead times.

Indeed, after Poland imported Korean weapons, Estonia, Finland, and Norway also bought K9 self-propelled howitzers, and Romania and Slovakia are discussing potential purchases. In Aug. 2023, the German government announced plans to simplify approval procedures for the export of defense goods to partner nations, including Korea; this should have a positive impact on exports of K2 tanks and K9 self-propelled howitzers equipped with German transmissions. (Currently, licenses are required for the export of Korean military equipment containing German military products.)

Potential export items include FA-50 light fighter jets (KAI), K2 tanks (Hyundai Rotem), K9 self-propelled artillery systems, Chunmoo multiple rocket launcher systems, and Redback infantry fighting vehicles (IFVs; Hanwha Aerospace). That said, Korea's export momentum could be dampened if European defense exporters like Germany, the UK, and France manage to improve their productivity.

Table 10. Weapons systems of Eastern European countries

Country	Fighter jets	Main battle tanks	Self-propelled artillery systems	Multiple rocket launcher systems	IFVs	Anti-aircraft
Poland	MiG-29, 23 units F-16C block 52, 36 units Su-22, 32 units FA-50, 2 units	Leopard, 247 units PT-91, 232 units T-72, 318 units K2, 28 units	2S1, 227 units M77, 111 units KRAB, 72 units K9, 12 units	BM-21, 75 units RM-70, 29 units WR-40, 75 units Homar-K, 1 unit	BMP-1, 1,225 units Rosomak, 359 units	ZSU-23 anti-aircraft vehicles
Czech Republic	JAS 39 Gripen, 12 units L-159A ALCA, 16 units	T-72, 30 units	M77, 48 units	-	BMP-2, 120 units Pandur II, 107 units	9K35 surface-to-air missiles
Croatia	MiG-21, 12 units	M-84, 75 units	2S1, 8 units PzH2000, 13 units	BM-21, 21 units M91, 6 units	M80, 100 units	-
Slovakia	MiG-29AS/UBS, 10 units	T-72, 30 units	M77, 3 units M2000, 24 units	RM-70, 30 units	BMP-1, 148 units BMP-2, 91 units M80, 17 units	2K12 surface-to-air missiles
Hungary	JAS 39 Gripen C, 12 units	Leopard2, 4 units T-72, 44 units	-	-	BTR-80, 120 units	2K12 surface-to-air missiles
Romania	F-16A, 14 units MiG-21, 16 units	T-55 220 units TR-85 157 units	2S1, 40 units Type 89, 34 units	APR-40, 134 units LAROM, 36 units HIMARS, 18 units	MLI-84, 142 units Piranha, 49 units	2K12 surface-to-air missiles 9K33 surface-to-air missiles CA-95 anti-aircraft weapons Gepard anti-aircraft tanks Hawk missiles
Bulgaria	Mig-29, 11 units Su-25, 6 units	T-72, 90 units	2S1, 48 units	BM-21, 24 units	BMP-1, 90 units BMP-23, 709 units	9K33 surface-to-air missiles 9K32 surface-to-air missiles ZSU-23 anti-aircraft vehicles

Notes: Red = Soviet-made; green = Western-made; blue = Korean; black = homegrown

Source: KIET, The Military Balance 2022, Mirae Asset Securities Research

Table 11. Korea's weapons exports to Europe

(Units, US\$mn)

Country	Product	Type	Year signed	Volume	Contract value	Supplier
Poland	239mm guided rocket	Guided missile	2022	10000		Hanwha Aerospace
	K239 Chunmoo	Multiple rocket launcher system	2022	288		Hanwha Aerospace
	K2	Main battle tank	2022	180	3,340	Hyundai Rotem
	K2	Main battle tank	2022	820		Hyundai Rotem
	K9	Self-propelled artillery system	2022	212	2,400	Hanwha Aerospace
	K9	Self-propelled artillery system	2022	460		Hanwha Aerospace
	FA-50	Light fighter jet	2022	48	3,000	KAI
	K9 frame	Self-propelled artillery system part	2016	96	260	Hanwha Aerospace
	K9 frame	Self-propelled artillery system part	2014	24	80	Hanwha Aerospace
Norway	K10	Ammunition resupply vehicle	2022	8		Hanwha Aerospace
	K9	Self-propelled artillery system	2022	4		Hanwha Aerospace
	K10	Ammunition resupply vehicle	2017	6		Hanwha Aerospace
	K9	Self-propelled artillery system	2017	24	383	Hanwha Aerospace
	AEGIR-18R	Combat support ship	2013	1	157-220	Hanwha Ocean
Turkey	1,500 HP automatic transmission	Tank engine	2023	40	239	SNT Dynamics
	K10	Ammunition resupply vehicle	2008	70	998	Hanwha Aerospace
	KT-1 Woongbi	Trainer aircraft	2007	40	400-500	KAI
	K9	Self-propelled artillery system	2001	280	1,000-1,200	Hanwha Aerospace
Finland	K9	Self-propelled artillery system	2022	5	32	Hanwha Aerospace
	K9	Self-propelled artillery system	2017	48	156	Hanwha Aerospace
Estonia	K9	Self-propelled artillery system	2022	12	89	Hanwha Aerospace
	K9	Self-propelled artillery system	2018	24	89	Hanwha Aerospace
Ukraine	K9 frame	Self-propelled artillery system part	2022			Hanwha Aerospace
UK	Tide	Combat support ship	2012	4	560-605	Hanwha Ocean

Source: SIPRI, Mirae Asset Securities Research

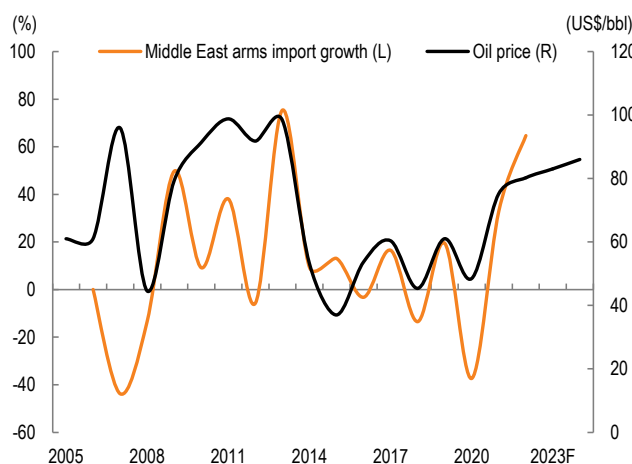
Export opportunity (2): The Middle East

While the Middle East has received less attention than Europe, the region's military buildup will likely make it one of the top defense markets in the world. Longstanding regional conflicts such as Yemen's civil war have contributed to strong demand for weapons. We also note that Middle East states have more fiscal room for arms spending due to the recent rise in oil prices.

Ground firepower, missiles, and missile defense systems are among the segments that should see the highest growth. Saudi Arabia's missile engagements have increased sharply since 2015 due to the Yemen conflict, a trend we see continuing for the foreseeable future. The UAE has purchased the Cheongung II KM-SAM systems and Chunmoo multiple rocket launcher systems, and Saudi Arabia is reportedly considering purchasing the Cheongung II and hybrid Biho air defense systems.

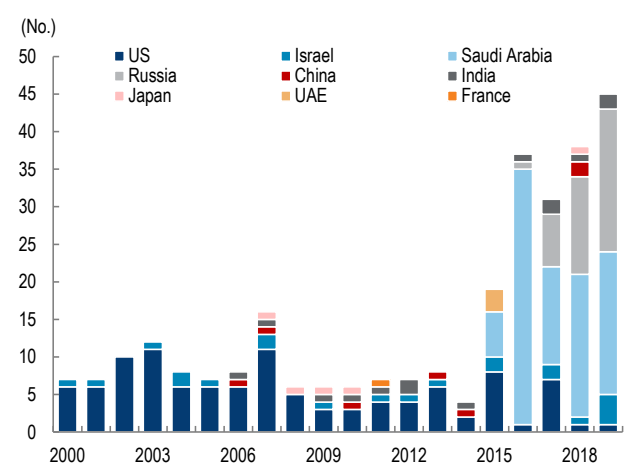
In early 2023, the UAE pledged around W40tr in investments to Korea and signed 13 MOUs on strategic defense industry cooperation. Procuring weapons from Russia and Europe has become increasingly difficult for Middle Eastern countries since the war in Ukraine began. Furthermore, the desire to avoid siding with either the US or China will likely prompt countries in the region to buy defense products from more politically neutral countries like Korea.

Figure 97. Middle East arms import growth vs. oil price movements



Source: SIPRI, EIA, Bloomberg, Mirae Asset Securities Research

Figure 98. No. of missile defense system engagements



Source: NTI, Mirae Asset Securities Research

Table 12. Korea's arms exports to the Middle East

(Units, US\$mnn)

Country	Product	Category	Year signed	Volume	Contract value	Maker
Saudi Arabia	Cheongung II	M-SAM	TBD	TBD	TBD	LIG Nex1
	Hybrid Biho II	Air defense system	TBD	TBD	TBD	Hanwha Aerospace
	K239 Chunmoo	Multiple rocket launcher system	2022	TBD	800	Hanwha Aerospace
	Bigung (LOGIR)	Surface-to-ship missile	2020	500	TBD	LIG Nex1
	Hyungung (Raybolt)	Anti-tank guided missile	2017	100	TBD	LIG Nex1
UAE	Cheongung II	M-SAM	2021	TBD	3,500	LIG Nex1
	K239 Chunmoo	Multiple rocket launcher system	2021	8	817	Hanwha Aerospace
Iraq	Promotor	Wheeled armored vehicle	2020	10	TBD	Daeji P&I
	T-50 jet trainer	Trainer/light combat aircraft	2013	24	1,100	KAI
	Barracuda	Wheeled armored vehicle	2004	12	TBD	Hanwha Aerospace
Jordan	70mm MLRS	Multiple rocket launcher system	2009	20	TBD	Hanwha Aerospace

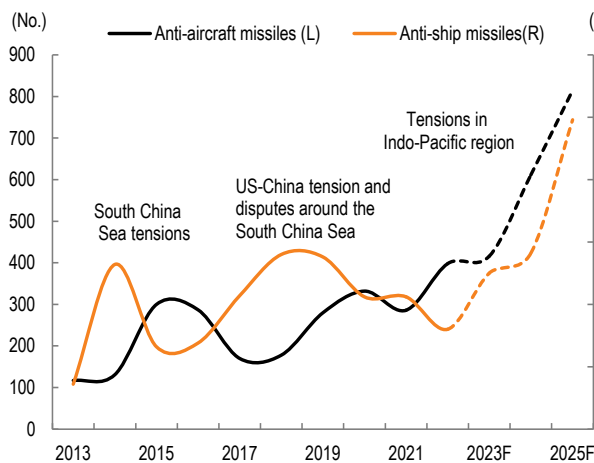
Source: SIPRI, media reports, Mirae Asset Securities Research

Export opportunity (3): Southeast Asia

Because of their proximity to the sea, Southeast Asian countries focus their military spending on battleships, fighter jets, anti-aircraft missiles, and anti-ship missiles rather than ground weapons. The region's arms imports tend to rise when tensions with China grow. Indeed, territorial disputes in the South China Sea have escalated since 2021, prompting affected countries to beef up their military capabilities; the combined weapons acquisition budget of the Philippines, Vietnam, Indonesia, and Malaysia increased 31.8% in 2021 and 25.7% in 2022.

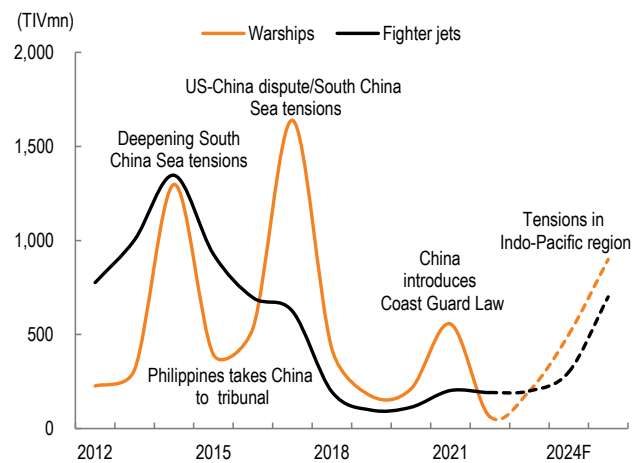
In particular, we believe Korean defense companies will find ample opportunities in the Philippines and Vietnam. Amid heightened tensions with China, these two nations look eager to engage in an arms race. The Philippines is already in talks with Korea for the sale of submarines, FA-50 light fighter jets, and Surion helicopters. And Vietnam is seeking to reduce its reliance on Russian arms, hosting its first large-scale international arms trade fair (dubbed VIDEX) in Dec. 2022 and highlighting defense cooperation with Korea during President Yoon Suk Yeol's recent state visit to the country.

Figure 99. Anti-aircraft/ship missile stockpiles of countries around the South China Sea



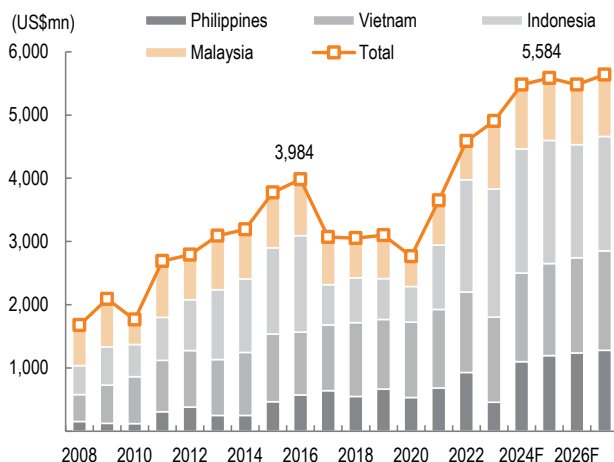
Source: SIPRI, Mirae Asset Securities Research

Figure 100. Warship/fighter jet imports of countries around the South China Sea



Source: SIPRI, Mirae Asset Securities Research

Figure 101. Weapons acquisition budgets of countries around the South China Sea



Source: Industry data, Mirae Asset Securities Research

Figure 102. Vietnam's military buildup plan

SOUTH CHINA SEA
Vietnam said to plan military buildup on South China Sea footholds
 Spratlys project risks backlash from China and Philippines over competing claims



Source: Media report, Mirae Asset Securities Research

Table 13. Korea's arms exports to Southeast Asia

(Units, US\$mn)

Country	Product	Category	Year signed	Volume	Contract value	Maker
Philippines	HHI-2400	Offshore patrol vessel	2022	6	573	HD Hyundai Heavy Industries
	K745 Blue Shark	Anti-submarine torpedo	2022	15		LIG Nex1
	HHI frigate	Frigate	2021	2	556	HD Hyundai Heavy Industries
	K745 Blue Shark	Anti-submarine torpedo	2021	25		LIG Nex1
	Pohang-class corvette	PCC	2021	1	Donated	
	K136	Multiple rocket launcher system	2018	22		Hanwha Aerospace
	C-STAR	Anti-vessel missile	2017	15		LIG Nex1
	Pohang-class corvette	PCC	2017	1	Donated	
	KAAV-7A1	Wheeled armored vehicle	2016	8	53	Hanwha Aerospace
	HHI-2600	Frigate	2016	2	311	HD Hyundai Heavy Industries
	K745 Blue Shark	Anti-submarine torpedo	2016	12		LIG Nex1
	FA-50	Light combat aircraft	2014	12	360-430	KAI
	LCU-1610	Landing craft utility	2014	1		HJSC
Indonesia	T-50 Golden Eagle	Jet trainer/light combat aircraft	2021	6	238	KAI
	Type 209/1400	Submarine	2019	3	1,000	Hanwha Ocean
	KP-SAM	Shoulder-launched surface-to-air missile	2018	60		LIG Nex1
	KT-1 Woongbi	Jet trainer	2018	3		KAI
	KP-SAM	Shoulder-launched surface-to-air missile	2012	150		LIG Nex1
	Type-209/1400	Submarine	2011	3	1,100-1,400	Hanwha Ocean
	KH179 155mm	Towed howitzer	2011	36		Hyundai Wia
	T-50 Golden Eagle	Jet trainer/light combat aircraft	2011	16	400	KAI
	KF-21 Boramae	Fighter jet	2010	80	1,600	KAI
	KH178 105mm	Towed howitzer	2010	54		Hyundai Wia
	Black Fox	IFV	2009	22	70	Doosan Infracore
	LVTP-7	Wheeled armored vehicle	2009	10	Donated	
	KT-1 Woongbi	Jet trainer	2005	8		KAI
	KT-1 Woongbi	Jet trainer	2005	5		KAI
	Barracuda	Wheeled armored vehicle	2003	20		Hanwha Aerospace
	KT-1 Woongbi	Jet trainer	2001	7	60	KAI
Vietnam	Pohang	PCC	2017	1	Donated	Hanwha Ocean
	Pohang	PCC	2016	1	Donated	Hanwha Ocean
Malaysia	FA-50	Light combat aircraft	2023	18	920	KAI
	Gagah Samudera	OPV	2011	2	95	Hanwha Ocean
	Barracuda	Wheeled armored vehicle	2009	20		Hanwha Aerospace

Source: SIPRI, Mirae Asset Securities Research

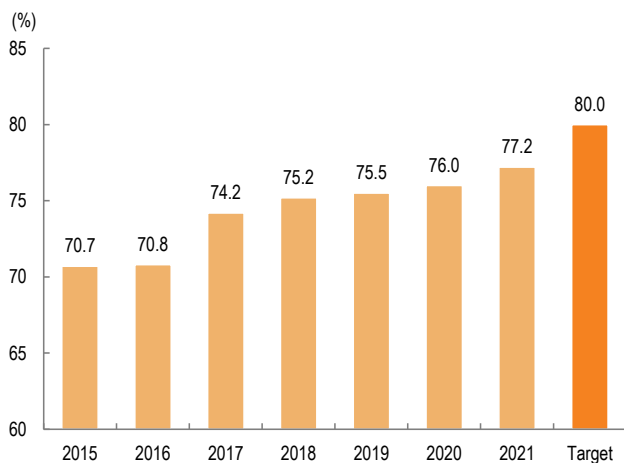
Homegrown defense products to fuel growth

We believe the domestic defense sector will enjoy structural growth, driven by the government's emphasis on made-in-Korea weapons systems and enhancement of domestic R&D and production capabilities. In the longer term, localization efforts could make homegrown products more competitive on the global stage, opening up new overseas markets and making defense products more economically viable.

According to the 2023-2027 Plan for Defense Parts Localization, the Defense Acquisition Program Administration aims to localize 80% of Korea's weapons production. As of 2021, 77.2% of defense products were produced locally, displaying average annual growth of 1.1%p since 2015. We expect the 80% target to be reached within the next two to three years.

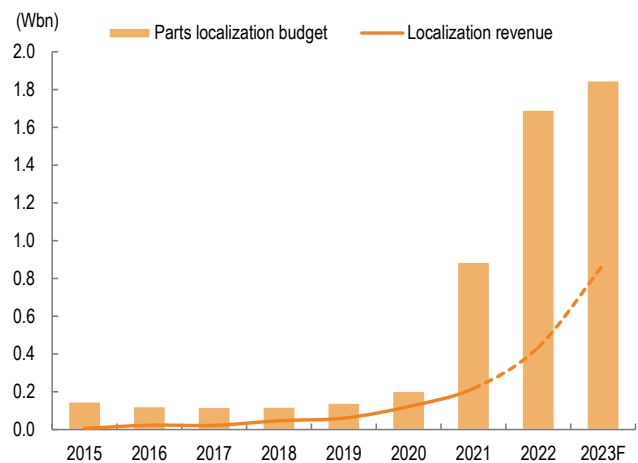
Localization is key to export growth because arms producers have to obtain the consent of parts suppliers when they export finished products to other countries. Indeed, German arms export embargoes have often impeded Korea's exports of the K9 Thunder self-propelled howitzer, which is powered by a German MTU engine.

Figure 103. Localization rate of Korea's weapons production



Source: Defense Acquisition Program Administration, Mirae Asset Securities Research

Figure 104. Korea's budget for defense parts localization



Source: Defense Acquisition Program Administration, Mirae Asset Securities Research

IV. Space: The next battleground

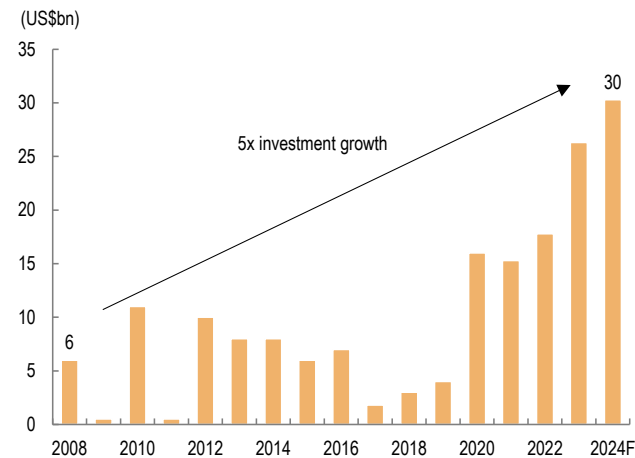
Space technology has proven military applications

The Russian-Ukraine war has shown the importance of not only conventional weapons but also innovative technologies like AI, drones, and space technology, which are likely to become crucial assets in future wars. Space technology is also anticipated to have useful commercial applications, offering connectivity to remote regions out of broadband internet reach and connecting Industry 4.0 technologies and devices such as AI, autonomous driving, smart farming, UAM, etc.

The space industry is set to take off in the coming years. Space technology has already proven effective during the Russian-Ukraine war, with SpaceX sending 15,000 Starlink terminals to Ukraine to restore communications in the country and Maxar and Planet Labs helping to track Russia’s military activity in real time with satellite images. Many experts see parallels between the space technology being deployed in the Russian-Ukraine war and the GPS technology that played an important role in the Gulf War, foreseeing a quantum jump in the future. In Mar. 2023, several earth imaging companies (Maxar, Planet Labs, BlackSky, etc.) signed large contracts with government agencies, including the Department of Defense.

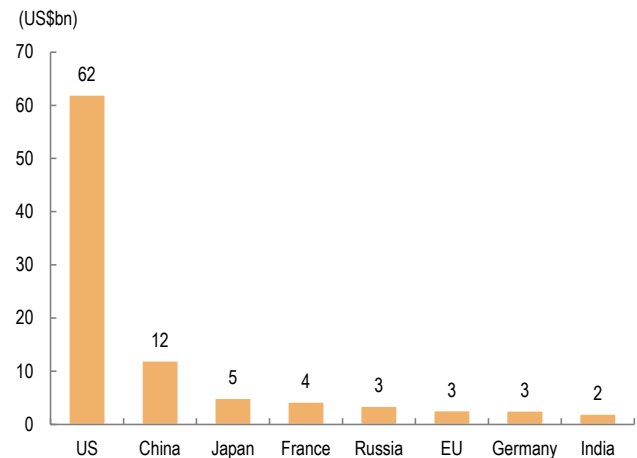
The US is leading the advancement of space technology. Since the establishment of the US Space Force (USSF) in Dec. 2019, military space systems have accounted for a major portion of the country’s defense budget, and we project the Department of Defense’s space program budget to jump five-fold between 2008 and 2024. With the Ukraine conflict showing the importance of space technology in modern warfare, other countries are also likely to join the race to strengthen their space capabilities. Accordingly, we may see technological competition reminiscent of the Cold War.

Figure 105. US Department of Defense: Space program budget



Source: DoD, Mirae Asset Securities Research

Figure 106. Space budget by country



Source: Mirae Asset Securities Research

Figure 107. Maxar captures images of Russian military deployment in Mazyr, Belarus



Source: Maxar, Mirae Asset Securities Research

Figure 108. Planet Labs confirms images of Russian fighter jets on a Belarus air force base



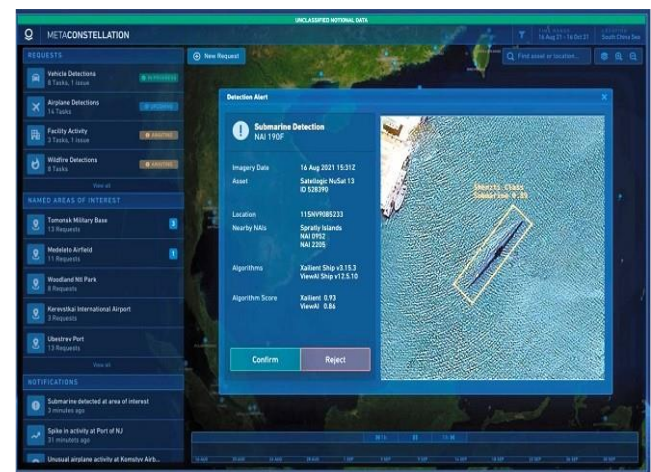
Source: Planet Labs, Mirae Asset Securities Research

Figure 109. Starlink terminals in Ukraine



Source: SpaceNews, Mirae Asset Securities Research

Figure 110. Palantir analyzes activities of Chinese military submarines and warships using satellite images



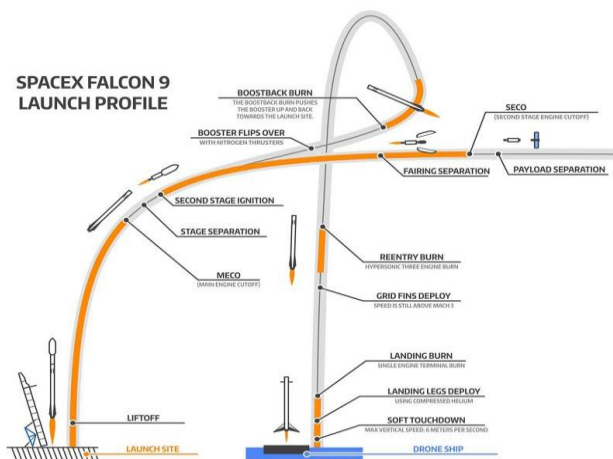
Source: Palantir Technologies, Mirae Asset Securities Research

Cost innovation to lay the foundation for growth

In the space industry, cost savings enabled by technology innovation have been a key driver of growth. SpaceX has played a crucial role in this process, with its reusable launch system cutting the cost to launch a Falcon Heavy rocket to US\$1,400 per kg—640 times cheaper than the launch of Vanguard and 10 times cheaper than the launch of Ariane 5. Furthermore, the time and cost required to manufacture satellites have fallen sharply. As space businesses become more affordable, more opportunities are emerging.

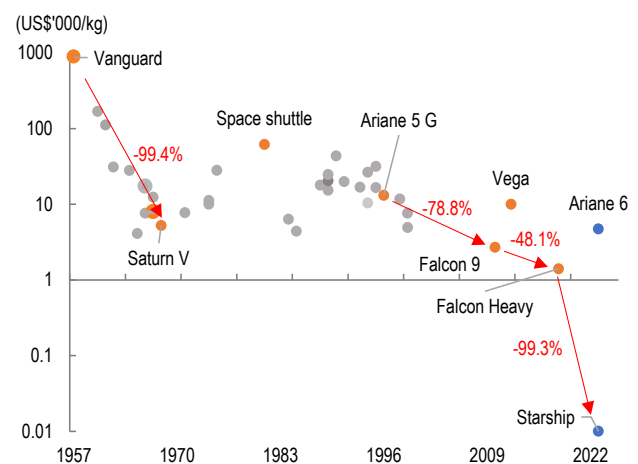
Costs are likely to decline further. The launch costs of Starship, SpaceX's launch vehicle under development, is projected to be 140 times cheaper than that of Falcon Heavy. As the starting point of all space-related businesses, launch vehicles play a particularly important role in providing new business opportunities through cost innovation. As the cost of launching a rocket declines further, more business opportunities will arise in the space industry.

Figure 111. How SpaceX's reusable launch system works



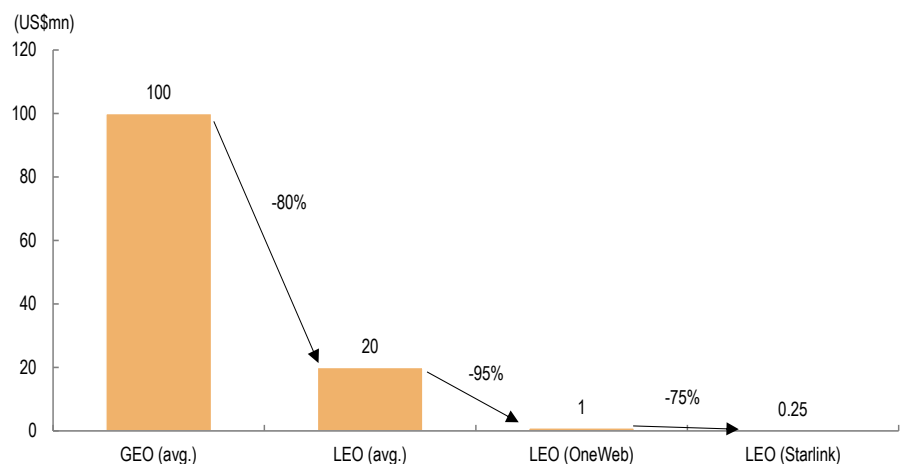
Source: Justatinker, Mirae Asset Securities Research

Figure 112. Chg. in launch cost/kg



Source: NASA Ames Research Center, Mirae Asset Securities Research

Figure 113. Satellite manufacturing costs



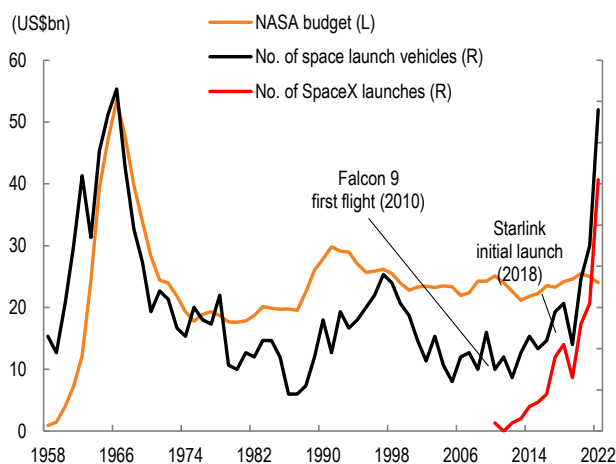
Source: Mirae Asset Securities Research

Entering a new space age

The world is entering a new space age, this one driven by the private sector rather than the government. While NASA's budget has not increased much (US\$24bn), the number of rockets launched by private companies has climbed sharply. In 2022, SpaceX was responsible for 78% of total US rocket launches (61 out of 78).

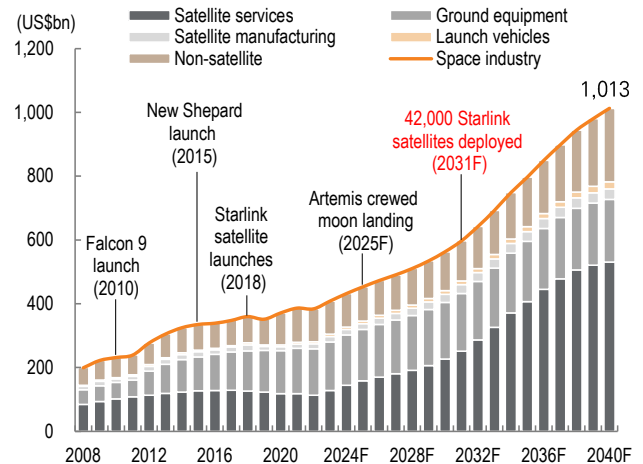
In this new era, the space industry is expected to experience exponential growth, aided by the emergence of new markets and players. We expect the global space industry to grow at a CAGR of 5.5% between 2022 (US\$384.1bn) and 2040 (US\$1tr). In commercial space, SpaceX, OneWeb, and Amazon are leading market growth by launching constellations of low Earth orbit (LEO) satellites to provide high-speed, low-latency internet. Going forward, we expect various new business models (space debris removal, space tourism, etc.) to emerge.

Figure 114. Commercial satellite launch services gain ground



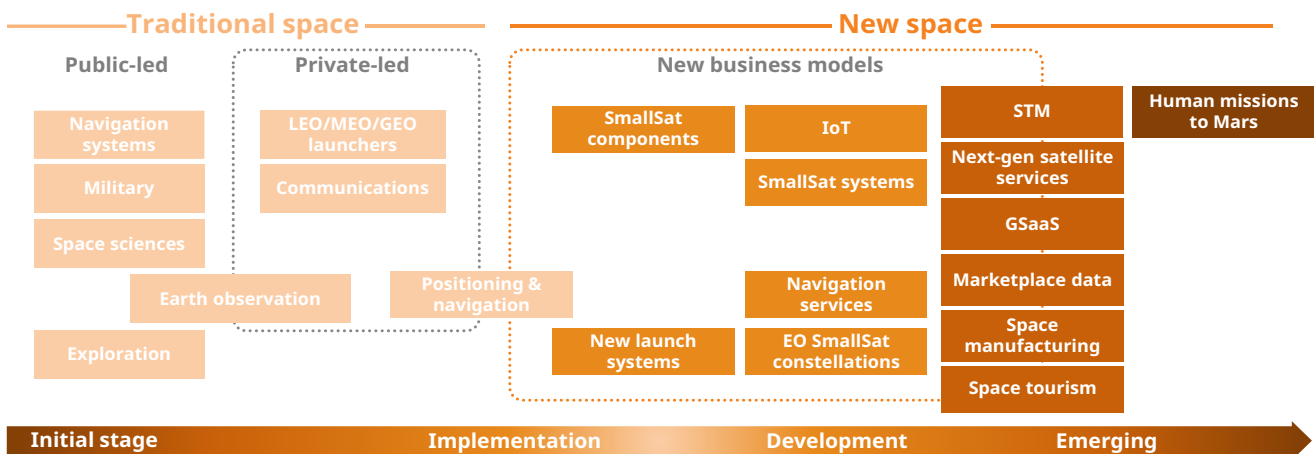
Source: NASA, press reports, Mirae Asset Securities Research

Figure 115. Global space market size and forecasts



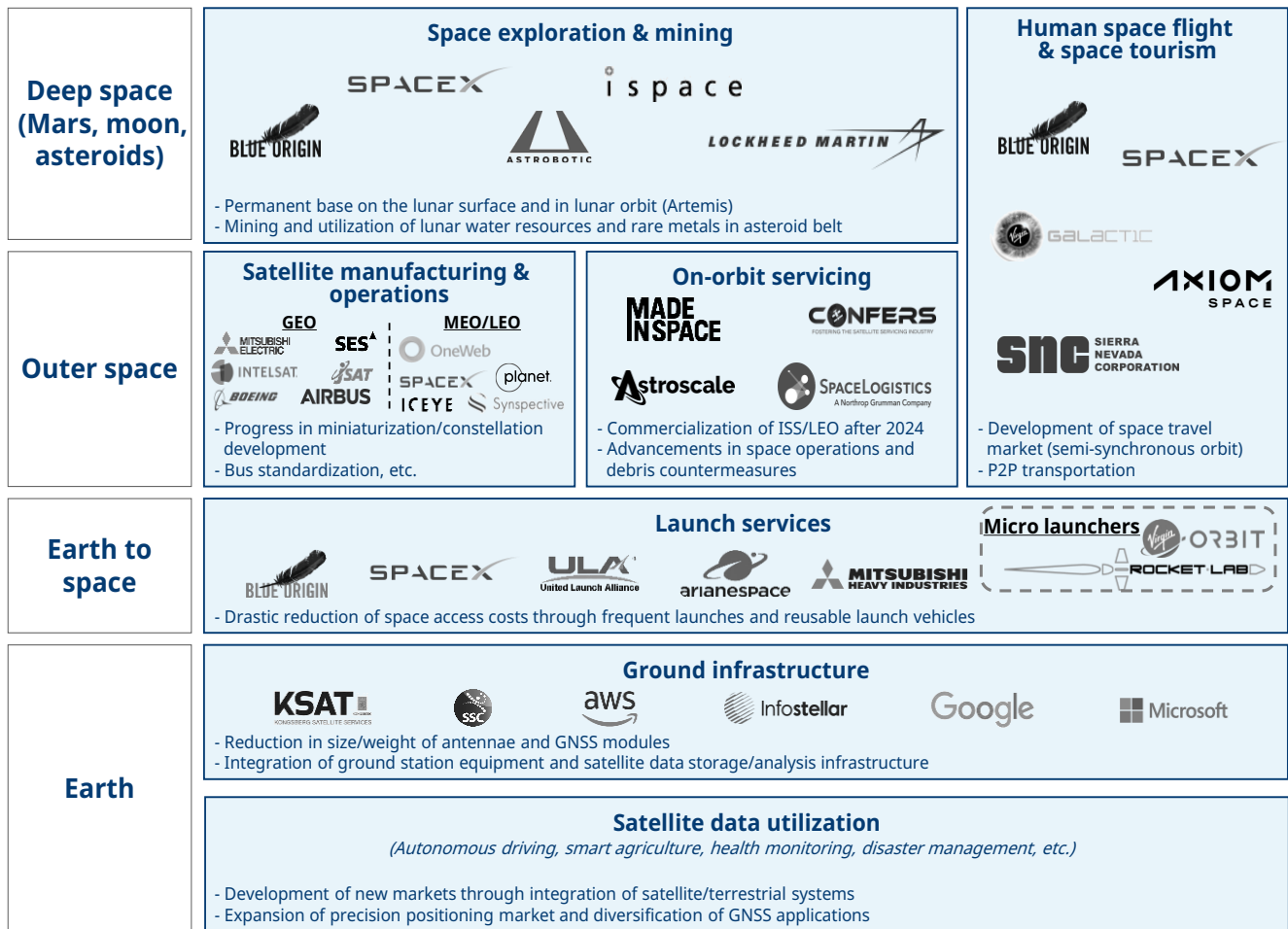
Source: SIA, Mirae Asset Securities Research

Figure 116. Traditional space vs. new space



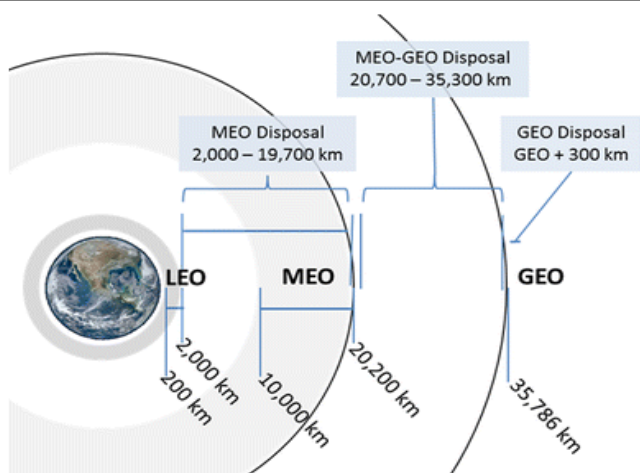
Source: Mirae Asset Securities Research

Figure 117. Business landscape of the new space age



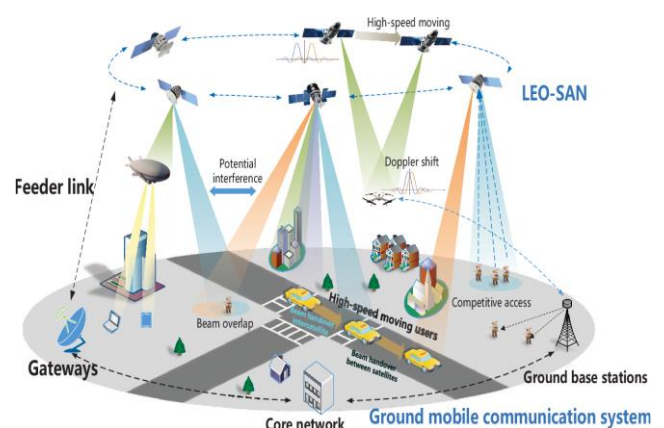
Source: Mirae Asset Securities Research

Figure 118. Satellites based on orbit type



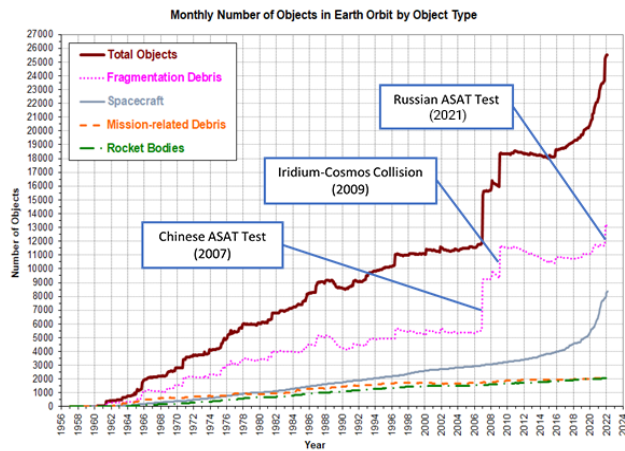
Source: The Space Infrastructure Vulnerability Cadastre, Mirae Asset Securities Research

Figure 119. LEO satellite constellations and space internet infrastructure



Source: "LEO Satellite Access Network (LEO-SAN) Towards 6G," Mirae Asset Securities Research

Figure 120. NASA estimates there are 27,000 pieces of orbital debris



Source: NASA ODPO, Mirae Asset Securities Research

Figure 121. ClearSpace: Space debris removal project



Source: ClearSpace, Mirae Asset Securities Research

Figure 122. Virgin Galactic's suborbital spacecraft flies tourists to space for the first time in 2023



Source: Virgin Galactic, Mirae Asset Securities Research

Figure 123. Blue Origin completes New Shepard's first human flight in 2021



Source: Blue Origin, Mirae Asset Securities Research

Figure 124. Rocket Lab's Electron rocket to support NASA's Artemis program



Source: Rocket Lab, Mirae Asset Securities Research

Figure 125. Intuitive Machines: Nova-C lunar lander



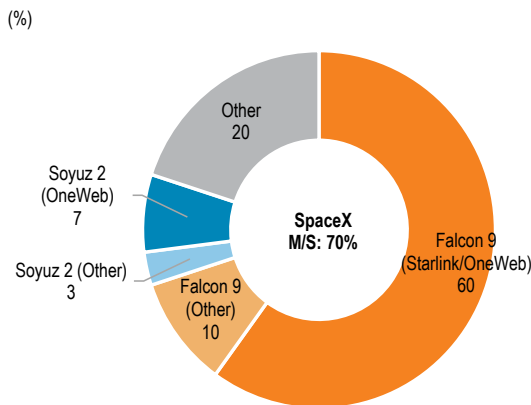
Source: Space, Mirae Asset Securities Research

Will the space business be profitable?

Despite growing expectations for the space industry, whether the business will turn a profit remains to be seen. However, SpaceX, the unrivaled leader in the commercial space industry, offers an encouraging glimpse of what is possible. According to *The Wall Street Journal*, SpaceX swung to positive territory just two years after launching Starlink, posting revenue of US\$1.5bn and net profit of US\$55mn in 1Q23. The firm's top line expanded sharply thanks to its monopoly in global launch services and a spike in Starlink subscribers. Going forward, we think the firm will be able to maintain its competitive edge thanks to Starship and Starlink.

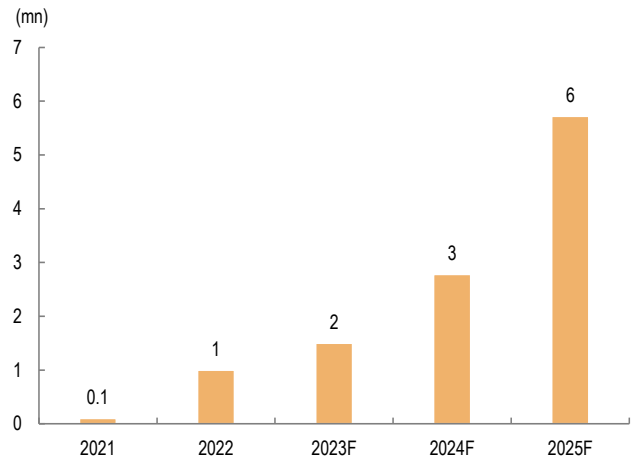
Notably, SpaceX's turn to profit this year could mark an inflection point for the growth of the space industry and spark investor interest in the space theme. Accordingly, we may see some investment opportunities in global space companies, satellite communications firms at home and abroad, and ground infrastructure businesses.

Figure 126. Global LEO satellite launch service: M/S by company (2018-22)



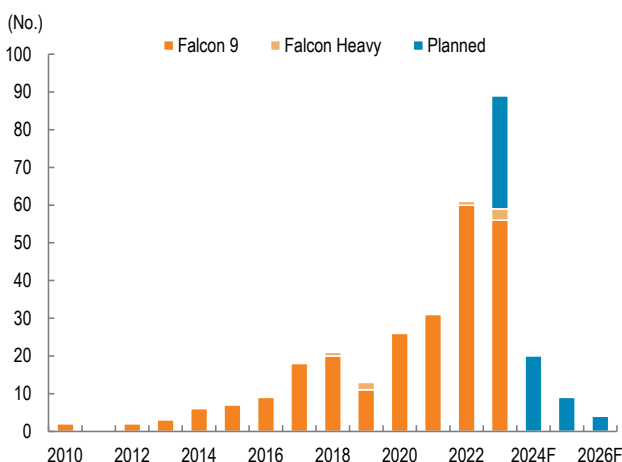
Source: CB Insights, Mirae Asset Securities Research

Figure 127. Starlink: No. of users and outlook



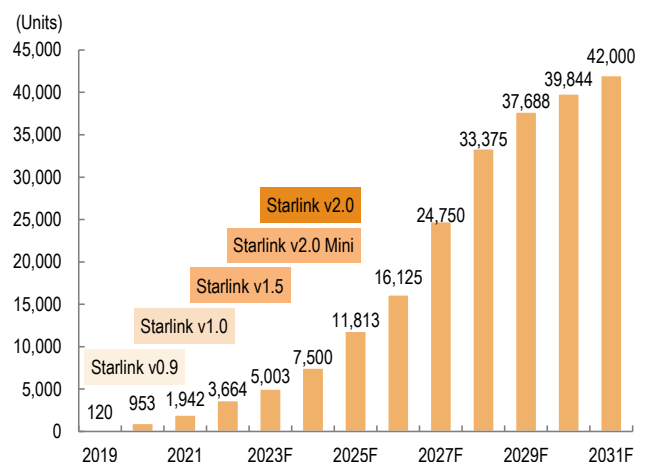
Source: CB Insights, Mirae Asset Securities Research

Figure 128. Falcon: No. of launches and plans



Source: Mirae Asset Securities Research

Figure 129. Starlink: No. of satellite launches and plans



Source: Mirae Asset Securities Research

Company analysis

Mirae Asset Securities Co., Ltd.

Dong-ho Jeong dongho.jeong@miraeasset.com



047810 KS • Defense/Aerospace

Korea Aerospace Industries

Ready for takeoff

(Initiate)

Buy

Target price

W76,000

Upside

54.5%

Current price (9/19/23)

W49,200

KOSPI	2,559.21	Market cap (Wbn)	4,796	Shares outstanding (mn)	97	Foreign ownership (%)	25.1
-------	----------	------------------	-------	-------------------------	----	-----------------------	------

Report summary

Initiate with Buy and TP of W76,000

We initiate our coverage of Korea Aerospace Industries (KAI) with a Buy rating and target price of W76,000. We derived our target price by applying a P/B of 4x—a 10% discount to the company's 2013-16 average P/B—to our 2024F BPS of W18,977.

Investment points

We highlight three key investment points: 1) the likely growth in domestic revenue and profits over the long term once mass production of the KF-21 and the light armed helicopter (LAH) gets underway; 2) expectations for additional FA-50 exports; and 3) the debut of the T-50 in the US trainer aircraft market.

2Q23 review and earnings outlook

For 2Q23, KAI posted revenue of W733.5bn (+9.7% YoY) and operating profit of W8.4bn (-75.6% YoY; OP margin of 1.1%). Operating profit contracted mainly due to loss provisions. For 2023 as a whole, we foresee revenue of W3.78tr (+35.8% YoY) and operating profit of W289bn (+104.3% YoY; OP margin of 7.6%), supported by revenue recognition for gap filler deliveries to Poland in 2H23.

Key data

Price performance



(%)	1M	6M	12M
Absolute	4.8	15.5	0.6
Relative	2.6	8.1	-7.4

Earnings and valuation metrics

(Dec.)	2021	2022	2023F	2024F	2025F
Revenue (Wbn)	2,562	2,787	3,783	3,773	4,580
OP (Wbn)	58	142	289	262	384
OP margin (%)	2.3	5.1	7.6	6.9	8.4
NP (Wbn)	64	118	259	212	300
EPS (W)	656	1,215	2,653	2,175	3,073
ROE (%)	5.2	8.8	16.7	12.1	15.1
P/E (x)	49.5	41.9	18.5	22.6	16.0
P/B (x)	2.5	3.5	2.9	2.6	2.3
Dividend yield (%)	0.6	0.5	0.5	0.5	0.5

Notes: Under consolidated K-IFRS; NP is attributable to owners of the parent

Source: Company data, Mirae Asset Securities Research estimates

Recommendation and valuation

Initiate with Buy and TP of W76,000

We initiate our coverage of KAI with a Buy rating and target price of W76,000. We derived our target price by applying a P/B of 4x—a 10% discount to the company's average P/B in 2013-16, when momentum from aircraft exports and the KF-21/LAH development projects was reflected—to our 2024F BPS of W18,977. We applied a 10% discount because: 1) the firm's ROE remains below the historical level; and 2) momentum from the firm's entry into the US trainer aircraft market has yet to be reflected.

Key investment points for KAI include: 1) the likely growth in domestic revenue and profits once mass production of the KF-21 and LAH gets underway; 2) expectations for additional FA-50 exports; and 3) the debut of the T-50 in the US trainer aircraft market. We believe the current situation is similar to that in 2013-16, when the company had just begun to export its KT-1 and T-50 aircraft and signed deals to develop the KF-X and LAH, which triggered upside share momentum. During that period, there were also expectations that the company would move into the US jet trainer market.

That said, we believe industry conditions and business dynamics are more favorable now than they were in 2013-16. With several additional overseas order wins expected between 2024 and 2026, we believe a re-rating will come once export momentum materializes and existing orders start to translate into revenue.

Table 14. KAI: TP calculation

	Value	Notes
Target price (W)	76,000	
Current price (W)	49,200	
Upside (%)	54.5	
Target P/B (x)	4.0	10% discount to the company's 2013-16 average P/B
2024F BPS (W)	18,977	2013-15 momentum: Aircraft exports and KF-21/LAH development projects 2016 momentum: Expectations on entry into US trainer aircraft market
2024F ROE (%)	12.1	

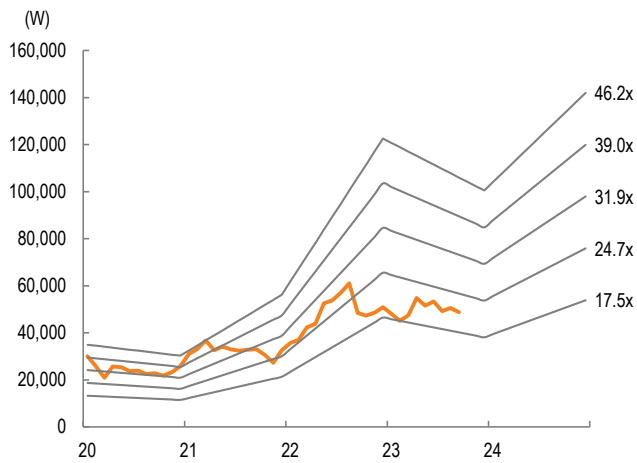
Source: Mirae Asset Securities Research

Table 15. KAI: P/B valuation trend

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F
Market cap (Wbn)	2,827	3,880	7,613	6,531	4,625	3,109	3,319	2,515	3,163	4,961	4,796		
Share price (W)	29,000	39,800	78,100	67,000	47,450	31,900	34,050	25,800	32,450	50,900	49,200		
P/B (ending, x)	3.1	3.9	6.3	4.5	4.1	3.1	2.9	2.1	2.5	3.5	2.9	2.6	2.3
P/B (high, x)	3.4	4.4	8.5	5.9	6.1	5.5	3.6	2.8	3.1	4.4	3.6	3.2	2.8
P/B (low, x)	2.4	2.7	3.0	3.8	3.1	2.7	2.6	1.3	2.0	2.2	2.4	2.2	1.9
P/B (avg., x)	2.9	3.4	5.7	4.8	4.7	4.0	3.1	2.0	2.5	3.2	2.9	2.6	2.3
BPS (W)	9,276	10,266	12,459	14,830	11,699	10,356	11,714	12,264	13,023	14,648	17,052	18,977	21,800
EPS (W)	372	1,358	2,659	2,717	(2,413)	587	1,748	766	656	1,215	2,653	2,175	3,073
YoY (%)	(51.1)	265.3	95.7	2.2	TTR	TTB	198.0	(56.2)	(14.4)	85.4	118.3	(18.0)	41.3
ROE (%)	4.0	13.9	23.4	19.9	(18.2)	5.3	15.8	6.4	5.2	8.8	16.7	12.1	15.1

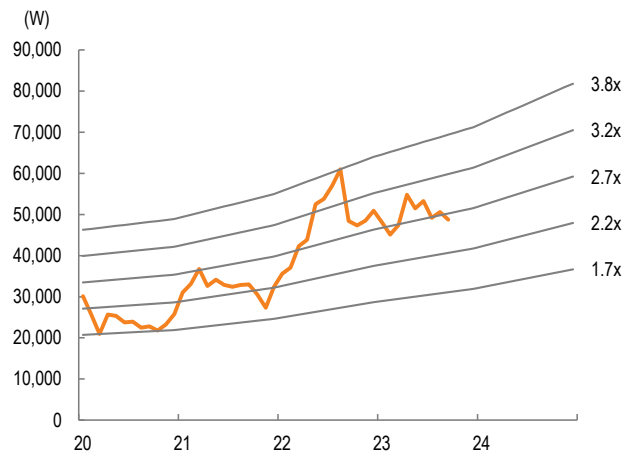
Source: Company data, Mirae Asset Securities Research

Figure 130. KAI: 12-month forward P/E band chart



Source: QuantiWise, Mirae Asset Securities Research

Figure 131. KAI: 12-month forward P/B band chart



Source: QuantiWise, Mirae Asset Securities Research

Table 16. Peer comparison

Company	Market Cap (US\$bn)	Return (%)		Revenue growth (%)		OP margin (%)		P/E (x)		P/B (x)		ROE (%)		EPS CAGR (%)
		1M	YTD	24F	25F	24F	25F	24F	25F	24F	25F	24F	25F	21-25F
Korean defense														
Hanwha Aerospace	4.2	1.3	48.1	13.5	7.8	7.5	8.2	17.3	13.9	1.6	1.4	9.3	10.6	72.6
KAI	3.6	4.9	-3.2	-0.3	21.4	6.9	8.4	22.6	16.0	2.6	2.3	12.1	15.1	42.5
Hyundai Rotem	2.4	3.0	4.0	13.9	14.8	6.5	7.4	23.1	17.4	1.8	1.6	10.9	12.8	65.9
Hanwha Systems	1.8	-5.4	18.7	6.6	6.8	5.0	6.0	18.4	15.3	1.1	1.1	6.4	7.3	-18.1
LIG Nex1	1.4	14.8	-6.5	18.2	12.9	8.9	10.2	9.1	7.1	1.5	1.3	17.8	19.4	37.1
Global fighter jets														
Boeing	123.7	-9.5	7.7	16.6	8.9	6.9	8.9	37.2	22.0	N/A	N/A	-17.9	-45.2	-51.1
Lockheed Martin	108.3	-4.5	-11.6	2.8	3.6	12.7	12.5	15.3	14.8	12.4	11.2	77.0	74.2	4.0
Northrop Grumman	66.7	2.4	-19.3	5.6	5.6	10.8	11.5	17.8	15.7	4.0	3.7	22.8	24.5	19.1
BAE Systems	39.7	9.5	23.2	5.8	6.8	10.9	11.1	15.7	14.4	2.6	2.5	16.7	17.6	13.5
Hindustan Aeronautics	16.0	5.2	57.4	12.2	13.4	21.0	20.9	22.9	19.8	4.5	3.8	19.9	19.6	19.8
Dassault Aviation	15.8	7.7	16.0	8.9	22.6	9.2	10.2	15.2	12.7	2.1	1.9	14.4	15.5	34.9
Textron	15.1	1.2	7.5	6.2	3.8	9.4	9.7	13.1	11.8	2.0	1.9	14.9	15.4	44.0
Leonardo	8.6	8.0	72.0	5.3	4.4	8.5	9.0	9.7	8.5	0.9	0.9	10.5	11.1	41.9
Saab	7.5	12.6	50.4	11.4	10.0	9.0	9.4	22.0	18.6	2.3	2.1	11.4	12.1	34.8

Source: Bloomberg, Mirae Asset Securities Research

2Q23 review and earnings outlook

2Q23 review

For 2Q23, KAI reported revenue of W733.5bn (+9.7% YoY) and operating profit of W8.4bn (-75.6% YoY; OP margin of 1.1%), missing consensus estimates. Operating profit was weaker than expected mainly due to W50.9bn in loss provisions stemming from the Iraqi airfield reconstruction project (W24.1bn), the satellite business (W19.6bn), and commercial helicopters (W6.6bn). Stripping away one-offs (including an W8bn provision reversal), we estimate operating profit came to around W50.9bn (OP margin of 8.5%).

Domestic revenue dipped 1.1% YoY to W486.5bn, as the KF-21 development program neared the final phase of test flights. Notably, the fighter jet passed the provisional combat suitability evaluation six months earlier than anticipated. If contracts for KF-21 mass production are finalized at the end of this year or early next year as anticipated, we believe they will serve as the key driver of domestic revenue through 2032.

The Iraqi airfield reconstruction project and the satellite business may require additional loss provisioning in 2H23. Nevertheless, we expect KAI to deliver solid top- and bottom-line growth from 3Q23, backed by the recognition of gap filler FA-50 orders from Poland (five in 3Q23 and seven in 4Q23). Additionally, plans to introduce the “percentage of completion” accounting method for export contracts are likely to take shape in 3Q23; this change should allow KAI to recognize orders from Poland and Malaysia as revenue from 4Q23 and early next year, respectively.

Table 17. KAI: 2Q23 review

(Wbn)

	2Q22	1Q23	2Q23			Consensus	
			Actual	QoQ (%)	YoY (%)	Est.	Diff. (%)
Revenue	669	569	734	29.0	9.7	704	4.2
OP	34	19	8	-56.7	-75.6	34	-75.2
NP	50	30	10	-66.7	-80.3	29	-66.4
OP margin (%)	5.2	3.4	1.1	-2.3	-4.0	4.8	-3.7
Net margin (%)	7.5	5.2	1.3	-3.9	-6.2	4.2	-2.8
Revenue by division							
Domestic	492	364	487	33.8	-1.1		
Aircraft exports	2	27	53	96.3	2125.0		
Aircraft parts	171	175	189	7.8	10.1		
Defense as % of revenue	74	69	74	4.9	-0.4		
Defense exports as % of revenue	0	7	10	2.9	9.4		

Source: Company data, QuantiWise, Mirae Asset Securities Research

Earnings outlook

For 2023, we expect KAI to deliver revenue of W3.78tr (+35.8% YoY) and operating profit of W289bn (+104.3% YoY; OP margin of 7.6%). With FA-50 exports to Poland starting to be reflected in revenue, we expect growth to pick up in 2H23. For 3Q23, we look for revenue of W1tr (+69.6% YoY) and an OP margin of 10.3%. In 2H23, revenue recognition for both the domestic division (KF-21 development program, the fourth round of Surion mass production, and initial LAH mass production) and aircraft exports (FA-50 exports to Poland) should drive full-year growth. There are also expectations for Surion exports to the Middle East and Asia. For aircraft parts, we see modest revenue growth amid a pickup in passenger demand. The aircraft parts business should also provide support for overall profits.

Table 18. KAI: Quarterly and annual earnings

(Wbn)

		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23F	4Q23F	2022	2023F	2024F	2025F
Order backlog	Total	18,265	17,775	20,664	24,596	25,054	24,588	24,773	25,086	24,596	25,086	32,194	39,742
	Domestic	8,327	7,931	7,546	8,325	8,001	7,628	8,161	8,673	8,325	9,096	12,779	19,206
	Aircraft exports	1,110	1,114	4,562	5,003	6,177	6,142	5,751	5,459	5,003	5,459	8,440	9,532
	Aircraft parts	8,827	8,730	8,556	11,268	10,876	10,818	10,861	10,954	11,268	11,326	10,975	11,004
Revenue	Total	641	669	609	869	569	734	1,033	1,448	2,787	3,783	3,773	4,580
	Domestic	405	492	412	588	364	487	429	538	1,897	1,818	1,886	2,126
	Aircraft exports	56	2	25	44	27	53	411	652	127	1,143	1,034	1,583.8
	Aircraft parts	177	171	171	230	175	189	188	253	748	804	833	850
Growth (%)	Total	4.7	-5.7	36.8	9.0	-11.2	9.7	69.6	66.7	8.8	35.8	-0.3	21.4
	Domestic	-1.4	-10.8	47.7	-0.5	-10.3	-1.1	4.3	-8.4	3.5	-4.2	3.7	12.7
	Aircraft exports	-43.5	-93.4	22.2	-29.2	-51.3	2,125.0	1,524.1	1,398.8	-41.6	799.7	-9.6	53.2
	Aircraft parts	73.0	47.2	19.5	62.0	-0.9	10.1	10.0	10.0	48.8	7.5	3.6	2.0
OP		39	34	30	37	19	8	106	156	142	289	262	384
	YoY (%)	367.0	-42.6	976.7	389.5	-50.5	-75.6	247.5	315.2	143.1	104.3	-9.4	46.4
	OP margin (%)	6.1	5.2	5.0	4.3	3.4	1.1	10.3	10.7	5.1	7.6	6.9	8.4
NP		37	50	52	(23)	30	5	77	114	116	227	190	288
	YoY (%)	207.9	-6.8	647.3	19.0	-19.2	-89.3	48.5	593.1	117.6	95.7	-16.1	51.5
	Net margin (%)	5.7	7.5	8.6	-2.7	5.2	0.7	7.5	7.9	4.2	6.0	5.0	6.3

Source: Company data, Mirae Asset Securities Research

Investment points

Start of mass production for large programs to drive domestic growth

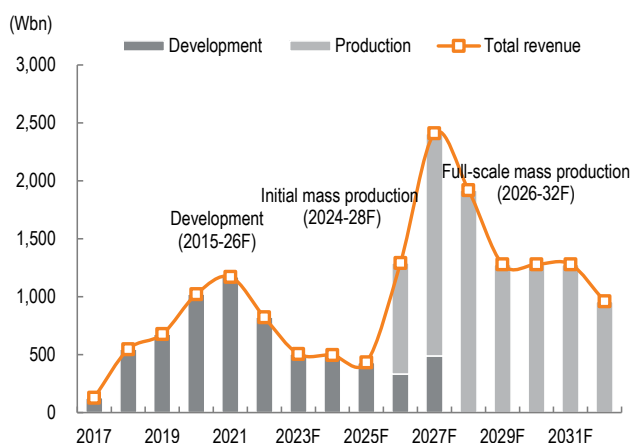
We expect KAI's domestic revenue and profit growth to gather traction as the KF-21 Boramae and LAH—two massive defense programs—enter the mass production stage in 2024.

We estimate that revenue from the KF-21/LAH programs alone will climb from W514bn in 2023 to W3.62tr in 2027, which implies a CAGR of 56%. We also expect profits to improve, given the higher margins for mass production programs (mid/high single digits or higher vs. low single digits for development programs).

The KF-21, Korea's first 4.5 generation fighter jet, was developed to replace the Republic of Korea Air Force's (ROKAF) aging F-4 and F-5 aircraft. KAI will supply a total of 120 KF-21s to the ROKAF, including 40 block 1 jets by 2028 and 80 block 2 jets by 2032. We estimate the KF-21 program will be worth W30tr in total, including W8tr for development, W700bn for additional armament, W9.6tr for mass production, and maintenance/operation costs.

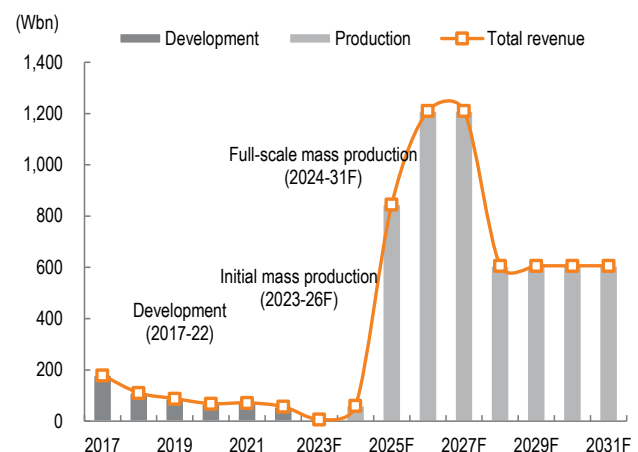
The LAH, Korea's first indigenous armed helicopter, was developed to replace the aging MD500 and AH-1S. The program completed development in 2022 and will undergo initial and full-scale mass production from 2023 through 2031 (with a total of 200 helicopters expected to be produced). We estimate the total size of the program will be around W17tr, including W580.8bn for development, W5.8tr for mass production, and maintenance/operation costs. KAI aims to sell 250 LAHs domestically and 180 overseas over the next two decades.

Figure 132. KF-21 series' development/mass production revenue forecasts



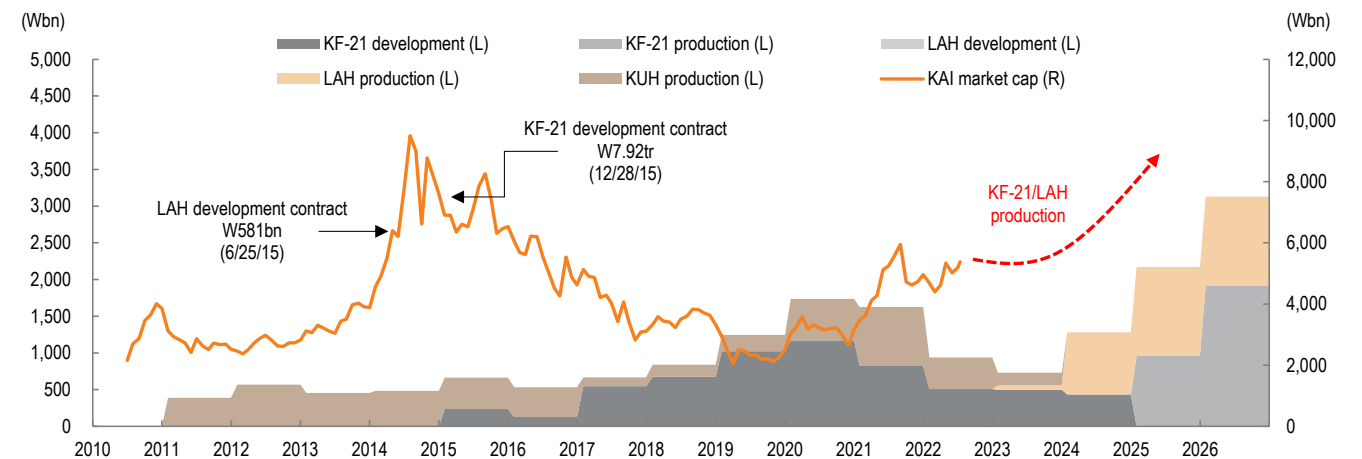
Source: Mirae Asset Securities Research estimates

Figure 133. LAH series' development/mass production revenue forecasts



Source: Mirae Asset Securities Research estimates

Figure 134. KAI's major program revenue and market cap trends



Source: Mirae Asset Securities Research

Table 19. KF-21/LAH program road map

Program	Phase	2022	2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
KF-21	Dev.	Ground test	Test flight			Additional armament						
	Initial.			Initial production (block 1) – Deploy 40 aircraft with ROKAF								
	Full-scale.					Full-scale production (block 2) – Deploy 80 aircraft with ROKAF						
LAH	Dev.	Dev. completed										
	Initial.		Initial production – Produce/supply 10 helicopters domestically									
	Full-scale.			Full-scale production – Produce/supply 190 helicopters domestically								

Source: DAPA, company data, Mirae Asset Securities Research

Figure 135. KF-21's test flight (sixth prototype)



Source: Company materials, Mirae Asset Securities Research

Figure 136. LAH's test flight (first prototype)



Source: Company materials, Mirae Asset Securities Research

Expectations on exports remain intact

KAI has continued to enjoy strong order momentum, landing deals for 48 FA-50s with Poland in 2022 and 18 FA-50s with Malaysia in 2023. Key points to watch going forward include: 1) the potential for additional order momentum; and 2) earnings growth from the revenue recognition of previously won contracts.

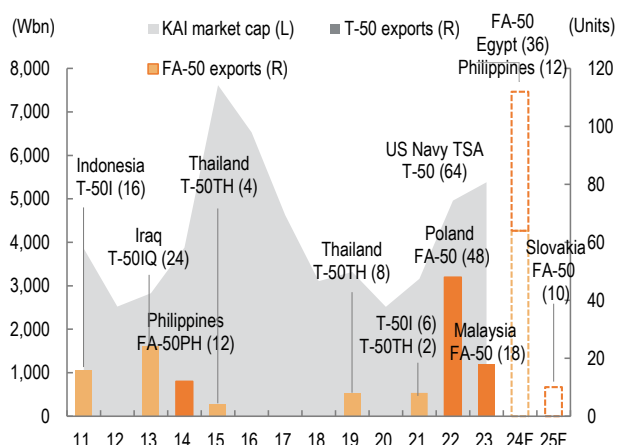
Aircraft exports are larger and have higher margins than the domestic business, making them a key driver of KAI's earnings and stock price. Following its deal with Iraq in 2013, the company won export contracts for several years, driving its share price higher. However, an absence of export deals from 2016 to 2018 led to share price weakness. The export picture has turned favorable again, with the FA-50 contracts the company has already won being significantly bigger and more profitable than its past deals.

The FA-50 light combat aircraft is KAI's best-selling export, with 78 aircraft under contract so far. Including potential supplies, 100 FA-50s are expected to be under contract, and more than 300 FA-50s are expected to be produced. We also see potential deals with Egypt (36-100 aircraft) in 2024 and Slovakia (10 aircraft) in 2025. And with KAI in talks with a number of other countries, we expect export momentum to continue.

Egypt's program (36 aircraft) is intended to replace its Alpha Jet advanced trainer/light attack aircraft, which have already surpassed their service life of 38 years. We think a positive outcome is likely, given that the main competitors are the M-346 and L-19, which have both been beaten out by the FA-50 on several occasions. Furthermore, Egypt has the world's fourth-largest fleet of F-16s, a model that is highly compatible with the FA-50.

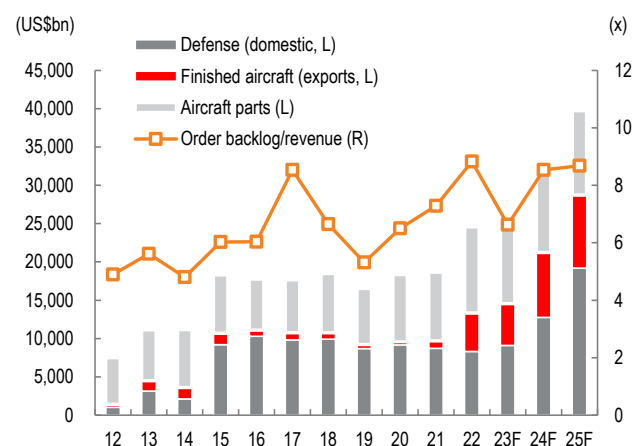
Slovakia's program (10 aircraft) is intended to replace its L-39 advanced trainers and also fill the gap left by the transfer of its MiG-29 fighter jets to Ukraine. We believe the FA-50 is the only model that can meet both requirements.

Figure 137. T-50/FA-50 series contract trends



Source: Media reports, Mirae Asset Securities Research

Figure 138. Aircraft exports: Order backlog and new orders



Source: Company data, Mirae Asset Securities Research

Competitive advantages of the FA-50

The FA-50 targets countries with limited defense budgets and those with more immediate defense needs. In addition to being used for pilot training, it can serve as a light combat aircraft in emergencies, while posing a lower operational burden and costing less than main fighter jets. For example, the FA-50 would reduce the cost of a close air support (CAS) mission by two-thirds compared with the F-16.

Furthermore, since the war in Ukraine broke out, European and Southeast Asian countries have been moving to phase out their old Soviet-made fighter jets (Su-22, MiG-29, etc.) and introduce Western-made ones (F-35, F-16, Rafale, etc.). Transitioning to new fighter jets requires significant time and resources for new training systems, maintenance practices, and production lines. Countries can reduce the burden of such transition costs by deploying the FA-50 as a way to bridge the gap until the introduction of the F-35 or F-16—after which the FA-50 can serve tactical training and CAS roles.

The FA-50 has several strengths. First, the price is reasonable; the pure aircraft price of the FA-50 averages W35-50bn (W30bn for the T-50), and its hourly operating cost is W3.5-4.5mn, only 30% of that of 4.5G fighter jets. Second, delivery lead times are relatively short, at one to three years. KAI's annual production capacity currently stands at 36 units, and production lines set to be added in 2024 would expand its annual capacity to 72 units. This would allow the firm to retain its competitive edge in delivery times. Third, the FA-50 boasts superior performance (vs. competing models) and compatibility with other models. The FA-50 is set to be upgraded with AESA radars, sniper targeting pods, advanced medium-range air-to-air missiles (AMRAAM), and an aerial refueling system. These upgrades should help expand the aircraft's applications, allowing countries to save on costs associated with mid/high-tier aircraft operations. In addition, the FA-50 is highly compatible with the F-16 fighter jet (over 80% overlap in components). Notably, only six to nine hours of flight time is required to train FA-50 pilots to fly the F-16.

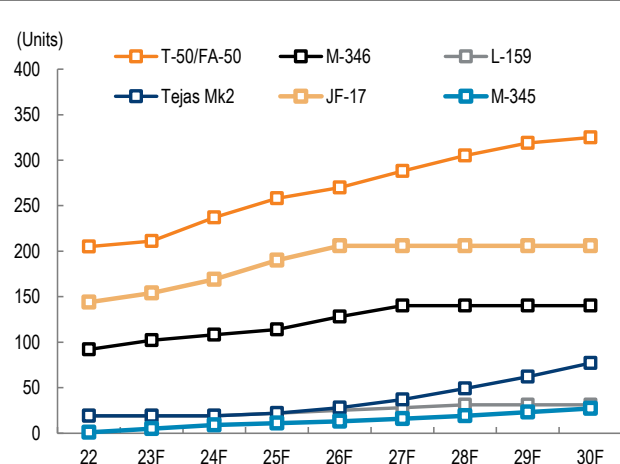
Currently, a total of 205 T-50/FA-50 jets are operating globally, and we expect the number to rise to 325, factoring in potential contracts in the pipeline. T-50/FA-50 jets hold a competitive edge over competitors like the M-346, Tejas Mk2, and JF-17 in terms of economies of scale and performance. Even the F-16, once known as a cost-effective model, now costs US\$75.6 million per unit for the block 70/72 model, with an estimated delivery time of four to five years. In pricing terms, we see few alternatives to the FA-50.

Figure 139. Unit price comparison: FA-50/T-50 vs. competitors

Segment	Product/model	Country	Company	Unit price (US\$mn)	Units
MRCA	JAS 39 E/F	Sweden	Saab	85	25
MRCA	F-16 C/D block 70/72	US	Lockheed Martin	76	106
MRCA	F/A-18E/F	US	Boeing	60	14
LCA	M-346FA	Italy	Leonardo	50	24
MRCA	JAS 39 C/D	Sweden	Saab	49	6
LCA	Tejas Mk 1A	India	HAL	41	83
LCA	JF-17 block 3	Pakistan	PAC	37	62
LCA	FA-50M	Korea	KAI	31	18
ADJ	T-5 (development)	Taiwan	AIDC	30	56
MRCA	MiG-29MM2	Russia	UAC	28	8
LCA	FA-50PL	Korea	KAI	27	48
ADJ	T-50TH batch 2	Korea	KAI	25	2
ADJ	M-346	Italy	Leonardo	25	16
ADJ	T-50I batch 2	Korea	KAI	24	6
ADJ	T-7A (development)	US	Boeing	23	228
ADJ	L-15	China	AVIC	20	15
ADJ	M-345	Italy	Leonardo	16	13
ADJ	JL-10	China	AVIC	15	48
ADJ	Yak-130	Russia	UAC	15	54
ADJ	L-39NG	Czechia	Aero Vodochody	14	24

Note: The unit price refers to the pure production costs, excl. options/ R&D/shipping.
Source: Janes, Mirae Asset Securities Research

Figure 140. Operational fleet outlook



Source: Janes, Mirae Asset Securities Research

Table 20. Potential FA-50/T-50 export contracts

(US\$mn)

Country	Program phase	Contract year	Expected value	Expected volume	Expected price	Notes
Egypt	RFP submission	2024	3,200	100	32	Final selection to be made in 2023; 30 aircraft expected to be imported and 70 to be locally produced in 2024
Uzbekistan	RFP submission	2024	TBD	TBD	TBD	FA-50 RFP submitted; financial proposal to be submitted in September
US Navy Tactical Surrogate Aircraft	RFI issue	2024	1,651	64	26	RFI issued in Oct. 2021; program to commence in 2024/25
Slovakia	RFP submission	2025	500	10	50	Designed to replace aging L-39 fighter jets and fill gap left by MiG-20 transfer
Philippines	Ongoing discussions	2024	600	12	50	12 upgraded variants of FA-50 to be introduced, likely after the repair of existing FA-50s
Colombia	Final selection	2024	600	20	30	Designed to replace Cessna A-37s; FA-50 selected; likely to be acquired after fighter jet replacement is completed
US Navy Undergraduate Jet Training System	RFI issue	2026	3,741	145	26	RFI issued in Jun. 2020 and additionally in Aug. 2023; final selection expected in 2025-26
US Navy Advanced Tactical Trainer	RFI issue	TBD	3,302	128	26	RFI issued in Oct. 2021; final selection and program timeline not yet confirmed
Ireland	Expression of interest	TBD	360	12	30	Ireland's Commission on Defence Forces proposes FA-50 procurement; as many as 24 jets to be acquired
Romania	Expression of interest	TBD	450	15	30	Set to replace aging IAR 99 advanced fighters; T-50 and M-346 are strong candidates
Australia	RFI issue	2028	2,500	34	74	Set to replace 33 aging Hawk-127 trainers; FA-50 to compete against T-7A and M-346; final selection expected in 2026

Source: Mirae Asset Securities Research

Figure 141. FA-50 unveiled at Air Show Radom 2023 in Poland



Source: KED Global, Mirae Asset Securities Research

Figure 142. KAI booth at MSPO 2023 in Poland



Source: Company materials, Mirae Asset Securities Research

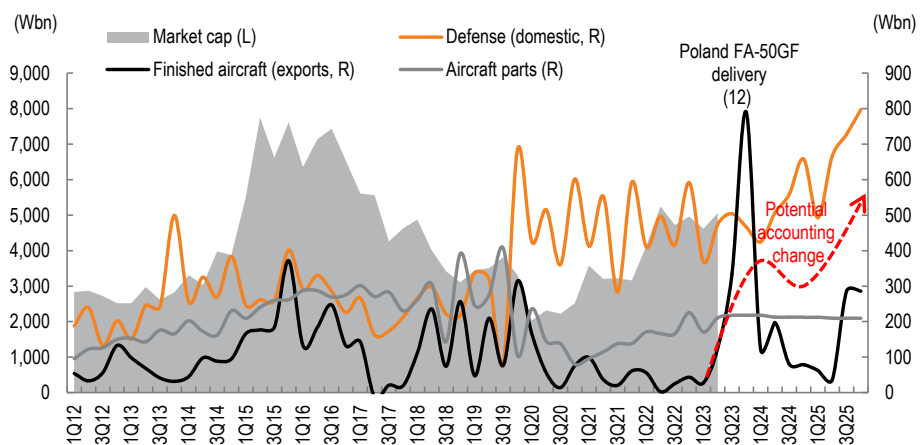
Percentage of completion accounting method to add to earnings stability

KAI's earnings and share price are set to increase as the company begins to recognize orders from Poland and Malaysia. Another positive change is the potential introduction of the percentage of completion accounting method.

KAI is currently conferring with its accounting firm about the possibility of using the percentage of completion method in recognizing previously won overseas contracts as well as future overseas orders. The discussions will likely come to a close in 2H23. If the change is implemented, overseas orders would be recognized based on the percentage of work completed, not on deliveries of specific units. In our view, this could put earnings on a solid upward trajectory while reducing volatility.

The change would also be good for investor sentiment. For reference, in 2013-14, KAI won overseas orders from Iraq (T-50IQ; W1.2tr) and the Philippines (FA-50PH; W442.7bn), and these were reflected based on the progress of the projects. The resulting steady revenue growth led to a share rally that lasted two to three years from the contract dates.

Figure 143. KAI: Revenue and market cap by business



Source: QuantiWise, Mirae Asset Securities Research

T-50 aiming to set global standard for advanced jet trainers

We expect the KAI T-50 advanced jet trainer to rapidly expand its global market share, aided by its: 1) supersonic speed; 2) compatibility with US combat aircraft (F-35, F-16, etc.); and 3) extensive track record in production and operation.

At present, the T-50 holds a modest 7% share in the global advanced jet trainer market (excluding China and Russia). That said, its share in the next-generation advanced jet trainer market is much higher, at 68%. Of the roughly 2,259 old jet trainers waiting to be replaced, we believe KAI can replace 260 (worth W9tr) with a 10% market share, 770 (W26.9tr) with a 30% market share, and 1,280 (W44.8tr) with a 50% market share.

The T-50's main rival is the M-346 advanced trainer made by Leonardo. The other models are either too old to offer advanced military pilot training or still in development. Having beaten out the M-346 on several occasions, we believe the T-50 has the potential to replace most older models.

Table 21. Market for advanced jet trainers and demand to replace old models

	Trainers	Maker	Country	Year of first flight	Units	Sonic speed	Units in operation	Status	Notes
Competing models	Hürjet	TAI	Turkey	2023	1	Supersonic	-	In development	
	T-5	AIDC	Taiwan	2020	17	Supersonic	-	In production	Taiwan introduced 66 units
	T-7A	Boeing/Saab	US/Sweden	2016	2	Supersonic	-	In development	US introduced 351 units
	M-346	Leonardo	Italy	2004	94	Transonic	92	In operation	
	T-50	KAI/Lockheed Martin	Korea/US	2002	208	Supersonic	205	In operation	Including TA-50/FA-50
	The market for next-generation advanced jet trainers						297	T-50 M/S: 68%	
Models to be replaced	T-45	Boeing (McDonnell)/BAE	US/UK	1988	221	Subsonic	194	In operation	To be replaced by UJTS
	IAR-99	Avioane Craiova	Romania	1985	28	Subsonic	20	In operation	
	S-211	SIAI/Aermacchi	Italy	1981	60	Subsonic	12	In operation	
	AT-3A/B	AIDC	Taiwan	1980	62	Subsonic	54	In operation	To be replaced by T-5
	G-4	SOKO	Yugoslavia	1978	85	Subsonic	35	In operation	
	MB-339	Aermacchi	Italy	1976	230	Subsonic	88	In operation	
	Hawk	BAE	UK	1974	1,000	Subsonic	650	In operation	Needs replacing
	Alpha Jet	Dassault/Dornier	France/Germany	1973	480	Subsonic	167	In operation	Needs replacing
	L-39	Aero Vodochody	Czechia	1968	2,900	Subsonic	578	In operation	Needs replacing
	T-38	Northrop Grumman	US	1959	1,146	Supersonic	623	In operation	To be replaced by APT/ATT
Demand to replace advanced jet trainers							2,664	*T-50 potential demand: 2,259 units	

Notes: 351 units of T-38 to be replaced by T-7A; 54 units of Taiwan's AT-3 to be replaced by T-5; demand from China and Russia excluded

Source: 2023 World Air Forces, The Military Balance 2023, Mirae Asset Securities Research

US programs to replace old jet trainers will likely prove pivotal to KAI's T-50 ambitions. In 2018, KAI failed to win the US Advanced Pilot Training (APT) project. But it has again partnered with Lockheed Martin to tap into the US, the world's biggest market for jet trainers.

The US Navy and Air Force plan to acquire 340-530 new jet trainers through three key trainer programs: Tactical Surrogate Aircraft (TSA), Undergraduate Jet Training System (UJTS), and Advanced Tactical Trainer (ATT). The candidates for the programs include the T-50A, T-7A, and M-346. KAI would be unlikely to make huge profits in the US, given that Lockheed Martin holds the license in the country. However, gaining US contracts would be meaningful, as the selected model would likely become the global standard, helping the company gain further ground and make greater profits elsewhere in the world.

Table 22. Jet trainer acquisition programs of the US Air Force and Navy

Project	Year of award	Models to be replaced	Candidates	No. of required jet trainers	Est. value	Estimated MRO value
TSA (Navy)	2024/2025	T-45	T-50/T-7A/ M-346	64	W2.5tr	W5.8tr
UJTS (Navy)	2025	T-45	T-50/T-7A/ M-346	145-220	W4.9tr	W11.5tr
ATT (Air Force)	TBD	AT-38	T-50/T-7A/ M-346	128-244	W5.1tr	W11.8tr

Source: Media reports, Mirae Asset Securities Research estimates

We believe the US Navy programs (TSA and UJTS) present particularly compelling opportunities for KAI. In its recent RFI for the UJTS program, the US Navy revealed that its top priority is the delivery schedule, followed by cost and performance. KAI's T-50 boasts the quickest delivery schedule among RFI respondents, and it may also have a more attractive price tag thanks to the economies of scale resulting from robust demand for the FA-50.

For the US Air Force's ATT program, the Boeing-Saab T-7A could still hold an advantage, following its APT project win in 2018. However, the T-7A has to evolve further to satisfy new Air Combat Command (ACC) requirements while being on schedule for the APT program—a challenging task. We believe the T-50 has an opportunity, as the ACC: 1) is considering all jet trainers that meet its needs; 2) is intent on introducing new trainers as quickly as possible; and 3) prefers a trainer that can fly at a lower cost.

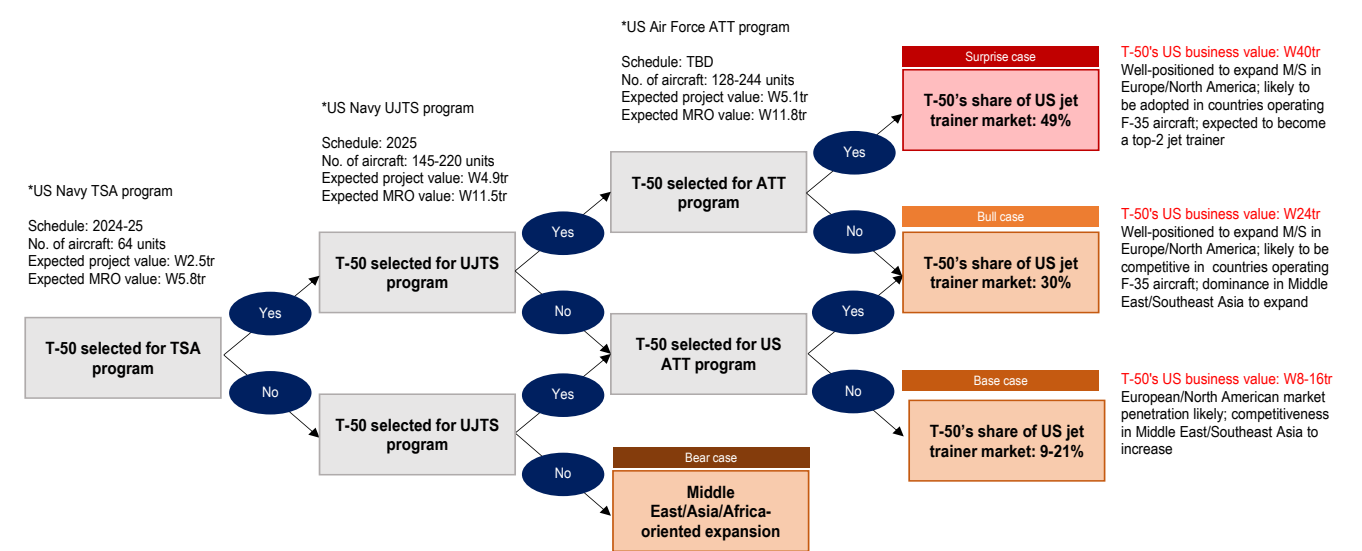
Table 23. Est. costs of new jet trainers for US Air Force and Navy

Description	Candidates			US jet trainers	
	T-50A	T-100 (M-346)	T-7A	T-38C (Air Force)	T-45C (Navy)
Cost per unit (US\$mn)	25.8	25	19.3	19	18.5
Hourly operation/maintenance cost (US\$)	2,700	2,500	9,021	9,021	4,997
Avg. flight hours per year (hours)	200	200	200	200	200
Yearly operation/maintenance cost (US\$mn)	0.9	5.4	2.7	2.7	1.5
Longevity (years)	25	25	25	25	25
Life cycle cost per unit (US\$mn)	39.3	37.5	55.3	64.1	43.5
Maximum speed	Supersonic (Mach 1.5)	Transonic (Mach 0.89)	Supersonic (Mach 1+)	Supersonic (Mach 1.3)	Transonic (Mach 0.85)
Empty weight (tonnes)	6.4	4.6	3.3	3.2	4.5
Countries behind technology/shape development	US/Korea	Europe/Russia	US/Sweden	US	US

Source: GAO, media reports, Mirae Asset Securities Research

Because it is difficult to estimate the exact probability of winning each bid, we instead performed a predictive analysis of the projects using a yes-no flow chart. We estimate the T-50's share in the US jet trainer market at 49% under a surprise scenario, 30% in a bull-case scenario, and 9-21% in a base-case scenario. Under the three scenarios, we estimate the value of the US business at W40tr, W24tr, and W8-16tr, respectively.

Figure 144. Various scenarios depending on the results of the US TSA/UJTS/ATT project bidding



Note: T-50's US business value is total revenue attributable to KAI and Lockheed Martin and is inclusive of acquisition (development/mass production) and MRO costs.
Source: Mirae Asset Securities Research estimates

Figure 145. T-50A (KAI/Lockheed Martin) Figure 146. T-100 (Leonardo) Figure 147. T-7A (Boeing/Saab)



Source: Company materials, Mirae Asset Securities Research



Note: The T-100 is an M-346 export model.
Source: Leonardo, Mirae Asset Securities Research



Source: Boeing, Mirae Asset Securities Research

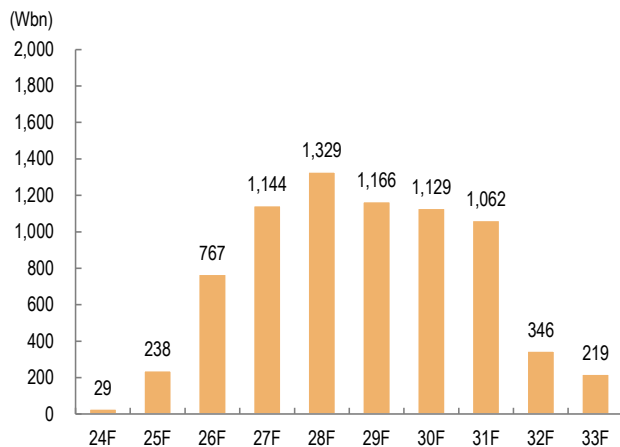
Lockheed Martin would likely be responsible for final assembly of the T-50 in the US, while KAI would be in charge of producing all components in the pre-assembly stages. Below are our estimates of KAI's revenues in the surprise/bull/base-case scenarios, assuming KAI accounts for 60% of the T-50 business in the US.

- 1) Surprise case (KAI wins TSA, UJTS, and ATT): W7.4tr (MRO revenue of W17.3tr)
- 2) Bull case (KAI wins UJTS and TSA): W4.4tr (MRO revenue of W10.2tr)
- 3) Base case (KAI wins TSA or UJTS): W1.5-2.9tr (MRO revenue of W3.5-6.8tr)

It should be noted that we excluded the value of the US jet trainer business from our current estimates, as politics can always affect the final results. For reference, KAI's T-50 was deemed the top candidate for the APT program back in 2018, but the US Air Force's final choice was the T-7A, which was still in development at the time.

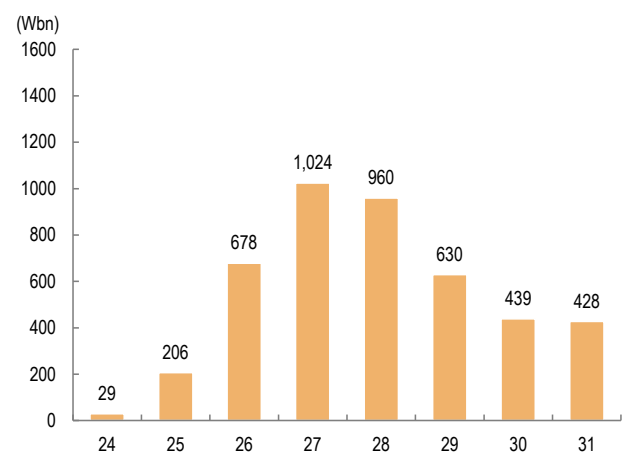
From 2024 onward, any positive news related to the T-50 will likely provide visible share momentum. If the T-50 looks likely to win the US Navy and Air Force projects, we may revisit our estimates to revise up the value of the US business.

Figure 148. KAI: Surprise-case revenue outlook



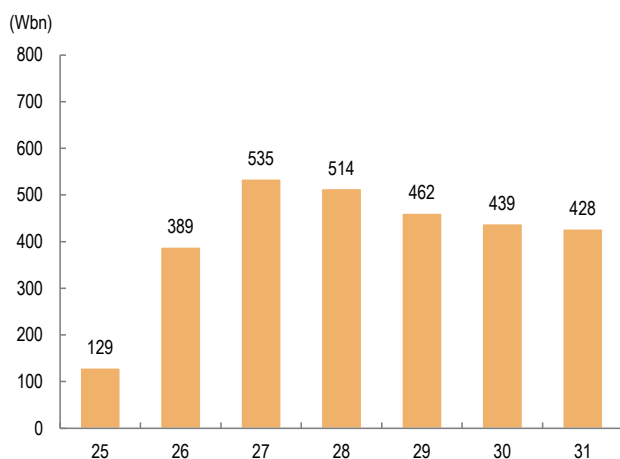
Source: Mirae Asset Securities Research estimates

Figure 149. KAI: Bull-case revenue outlook



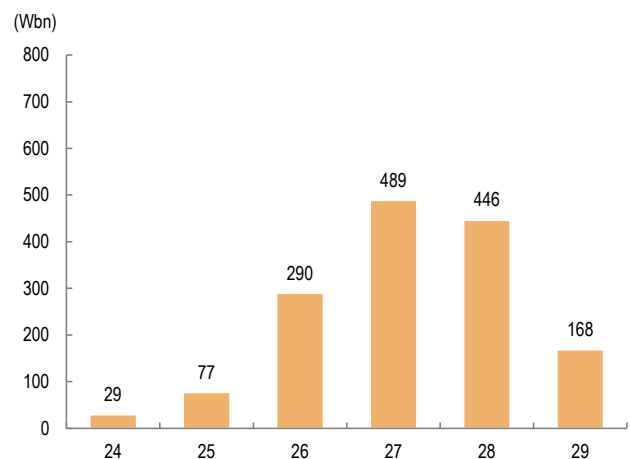
Source: Mirae Asset Securities Research estimates

Figure 150. KAI: Base-case revenue outlook (I)



Source: Mirae Asset Securities Research estimates

Figure 151. KAI: Base-case revenue outlook (II)



Source: Mirae Asset Securities Research estimates

Company overview

Sole aircraft manufacturer in Korea

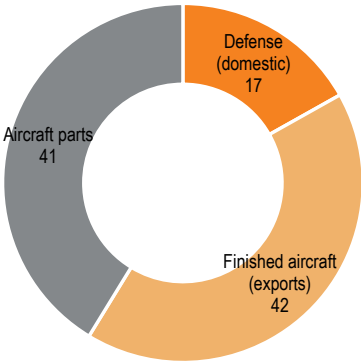
KAI was established in 1999 through the merger of the aviation/aerospace units of Samsung Aerospace, Daewoo Heavy Industries, and Hyundai Space and Aircraft Company. The company develops/manufactures supersonic fighter jets, light combat aircraft, advanced jet trainers, etc.

The firm’s businesses are largely divided into: 1) the domestic business (defense); 2) aircraft exports; and 3) the airframe business. Its flagship products include the KF-21, the T-50/FA-50 series, and the KUH/LAH series. The airframe unit supplies main wings, tails, fuselages, and other parts for both civilian and military aircraft; major customers are Boeing (US) and Airbus (Europe).

KAI holds a domestic monopoly in the fixed/rotary wing segment and has recently strengthened its global presence with exports of the FA-50 to Malaysia and Poland. As of 2022, domestic sales contributed 68% of revenue (17% of orders), aircraft exports 5% (42% of orders), and airframes 27% (41% of orders).

Figure 152. KAI: Order breakdown by business (2022)

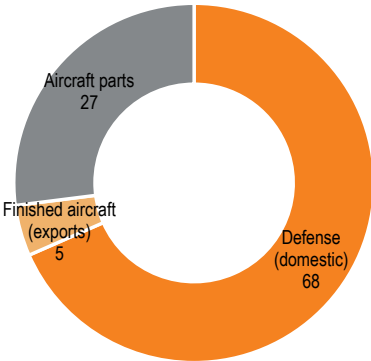
(%)



Source: Company data, Mirae Asset Securities Research

Figure 153. KAI: Revenue breakdown by business (2022)

(%)



Source: Company data, Mirae Asset Securities Research

Korea Aerospace Industries (047810 KS)

Income statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Revenue	2,787	3,783	3,773	4,580
Cost of revenue	2,413	3,270	3,228	3,889
GP	374	513	545	691
SG&A expenses	232	224	283	307
OP (adj.)	142	289	262	384
OP	142	289	262	384
Non-operating profit	-20	35	4	17
Net financial income	-3	25	25	29
Net income from associates	-1	2	0	0
Pretax profit	122	324	266	401
Income tax	6	70	56	104
Profit from continuing operations	116	255	210	297
Profit from discontinued operations	0	0	0	0
NP	116	255	210	297
Attributable to owners	118	259	212	300
Attributable to minority interests	-3	-4	-2	-3
Total comprehensive income	175	255	210	297
Attributable to owners	178	274	227	321
Attributable to minority interests	-3	-19	-17	-24
EBITDA	277	409	388	518
FCF	1,424	95	207	449
EBITDA margin (%)	9.9	10.8	10.3	11.3
OP margin (%)	5.1	7.6	6.9	8.4
Net margin (%)	4.2	6.8	5.6	6.6

Balance sheet (summarized)

(Wbn)	2022	2023F	2024F	2025F
Current assets	5,389	6,184	6,764	7,560
Cash & equivalents	2,024	1,793	1,709	1,874
AR & other receivables	227	359	409	430
Inventory	1,593	2,069	2,446	2,771
Other current assets	1,545	1,963	2,200	2,485
Non-current assets	2,383	2,708	2,863	3,006
Investments in associates	15	25	20	21
PP&E	827	1,050	1,141	1,216
Intangible assets	746	788	858	925
Total assets	7,772	8,892	9,628	10,566
Current liabilities	5,055	6,073	6,662	7,331
AP & other payables	393	417	462	515
Short-term financial liabilities	549	685	669	648
Other current liabilities	4,113	4,971	5,531	6,168
Non-current liabilities	1,264	1,136	1,097	1,094
Long-term financial liabilities	605	444	359	290
Other non-current liabilities	659	692	738	804
Total liabilities	6,319	7,208	7,759	8,425
Equity attributable to owners	1,428	1,662	1,850	2,125
Capital stock	487	487	487	487
Capital surplus	128	128	128	128
Retained earnings	833	1,067	1,255	1,530
Minority interests	25	22	19	16
Shareholders' equity	1,453	1,684	1,869	2,141

Cash flow statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Operating cash flow	1,493	406	407	639
NP	116	255	210	297
Non-cash income/expenses	176	216	206	248
Depreciation	91	90	98	103
Amortization	44	30	29	31
Other	41	96	79	114
Chg. in working capital	1,228	-41	21	169
Chg. in AR & other receivables	28	-83	-56	-21
Chg. in inventory	-243	-474	-377	-325
Chg. in AP & other payables	59	7	8	14
Income tax	-17	-57	-56	-104
Cash flow from investing activities	-204	-584	-420	-436
Chg. in PP&E	-69	-311	-188	-178
Chg. in intangible assets	-161	-68	-98	-98
Chg. in financial assets	-29	-55	-46	-56
Other	55	-150	-88	-104
Cash flow from financing activities	-103	-61	-137	-119
Chg. in financial liabilities	-76	-26	-102	-89
Chg. in equity	0	0	0	0
Dividends	-19	-24	-24	-24
Other	-8	-11	-11	-6
Chg. in cash	1,137	-231	-84	165
Beginning balance	887	2,024	1,793	1,709
Ending balance	2,024	1,793	1,709	1,874

Source: Company data, Mirae Asset Securities Research estimates

Key valuation metrics/ratios

	2022	2023F	2024F	2025F
P/E (x)	41.9	18.5	22.6	16.0
P/CF (x)	17.0	10.2	11.5	8.8
P/B (x)	3.5	2.9	2.6	2.3
EV/EBITDA (x)	14.3	9.3	9.6	6.7
EPS (W)	1,215	2,653	2,175	3,073
CFPS (W)	2,991	4,827	4,270	5,582
BPS (W)	14,648	17,052	18,977	21,800
DPS (W)	250	250	250	250
Dividend payout ratio (%)	21.0	9.6	11.6	8.2
Dividend yield (%)	0.5	0.5	0.5	0.5
Revenue growth (%)	8.8	35.8	-0.3	21.4
EBITDA growth (%)	33.7	47.7	-5.0	33.3
OP growth (%)	143.1	104.3	-9.4	46.4
EPS growth (%)	85.4	118.3	-18.0	41.3
AR turnover (x)	12.1	14.1	10.8	11.8
Inventory turnover (x)	1.9	2.1	1.7	1.8
AP turnover (x)	11.1	13.3	12.8	14.7
ROA (%)	1.7	3.1	2.3	2.9
ROE (%)	8.8	16.7	12.1	15.1
ROIC (%)	11.7	28.7	19.3	24.1
Debt-to-equity ratio (%)	434.8	428.1	415.1	393.4
Current ratio (x)	106.6	101.8	101.5	103.1
Net debt-to-equity ratio (%)	-70.4	-60.4	-57.2	-63.9
Interest coverage ratio (x)	6.5	8.7	6.9	11.4

Mirae Asset Securities Co., Ltd.

Dong-ho Jeong dongho.jeong@miraeasset.com



079550 KS • Defense

LIG Nex1

Major beneficiary of Korea's defense spending

(Initiate)

Buy

Target price
₩130,000

Upside
52.4%

Current price (9/19/23)
₩85,300

KOSPI	2,559.21	Market cap (Wbn)	1,877	Shares outstanding (mn)	22	Foreign ownership (%)	14.4
-------	----------	------------------	-------	-------------------------	----	-----------------------	------

Report summary

Initiate with Buy and TP of ₩130,000

We initiate our coverage of LIG Nex1 with a Buy rating and target price of ₩130,000. We derived our target price by applying a P/B of 2.3x—a 10% discount to the firm's average P/B in 2015-18, when tensions over the South China Sea escalated—to our 2024F BPS of ₩56,639.

Investment points

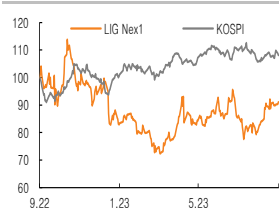
We highlight three key investment points: 1) increased defense enhancement spending and establishment of the 3K defense system; and 2) sustained export momentum for the Cheongung II, Hyungung, and KM-SAM missile systems (Europe, the Middle East, and Southeast Asia); and 3) promising new businesses (L-SAM, LAMD, etc.).

2Q23 review and earnings outlook

For 2Q23, LIG Nex1 posted revenue of ₩545.8bn (+11.3% YoY) and operating profit of ₩40.2bn (-14.7% YoY). OP margin edged down YoY to 7.4% due to one-off factors (transition from mass to batch production and provisioning against losses). For 2023, we look for revenue of ₩2.51tr (+13% YoY) and operating profit of ₩203.2bn (+13.4% YoY; OP margin of 8.1%).

Key data

Price performance



(%)	1M	6M	12M
Absolute	13.6	23.3	-6.7
Relative	11.2	15.4	-14.1

Earnings and valuation metrics

(Dec.)	2021	2022	2023F	2024F	2025F
Revenue (Wbn)	1,820	2,216	2,507	2,962	3,345
OP (Wbn)	97	179	203	264	341
OP margin (%)	5.3	8.1	8.1	8.9	10.2
NP (Wbn)	105	123	166	205	264
EPS (₩)	4,775	5,588	7,553	9,340	11,988
ROE (%)	14.6	14.5	16.6	17.8	19.4
P/E (x)	14.4	16.5	11.3	9.1	7.1
P/B (x)	2.0	2.2	1.7	1.5	1.3
Dividend yield (%)	1.7	1.6	1.8	1.8	1.8

Notes: Under non-consolidated K-IFRS; NP is attributable to owners of the parent

Source: Company data, Mirae Asset Securities Research estimates

Recommendation and valuation

Initiate with Buy and TP of W130,000

We initiate our coverage of LIG Nex1 with a Buy rating and target price of W130,000. We derived our target price by applying a P/B of 2.3x—a 10% discount to the firm's average P/B in 2015-18, when tensions over the South China Sea escalated—to our 2024F BPS of W56,639. Given that the security situation is even worse now than it was then and that the firm's order backlog is at a record high (W12tr), the stock looks undervalued, trading at a 2024F P/B of 1.4x. That said, we applied a 10% discount to our valuation because exports to Southeast Asia have yet to materialize.

With North Korea ramping up its missile launches and military drills, LIG Nex1 stands to benefit from Korea's increased defense enhancement spending and establishment of the 3K defense system. Based on domestic sales, we forecast the firm to grow at a CAGR of at least 12.7% between 2023 and 2027—equal to the projected growth in defense enhancement spending over the same period.

Export momentum should also remain strong, with a number of potential deals being discussed/negotiated (for Cheongung II, Hyungung, KP-SAM, C-STAR, etc.). Romania, Saudi Arabia, and Malaysia are considering buying Cheongung II M-SAM missiles (which have already been purchased by the UAE), and the UK is in the process of importing the Hyungung missile system. Meanwhile, some Southeast Asian countries could import the Cheongung II and the C-STAR systems, given escalating tensions in the South China Sea.

Table 24. LIG Nex1: TP calculation

	Value	Notes
TP (W)	130,000	
CP (W)	85,300	
Upside (%)	52.4	
Target P/B (x)	2.3	10% discount to the company's avg. P/B in 2015-18, when tensions over the South China Sea escalated; discount applied as exports to Southeast Asia have yet to materialize
2024F BPS (W)	56,639	
2024F ROE (%)	17.8	

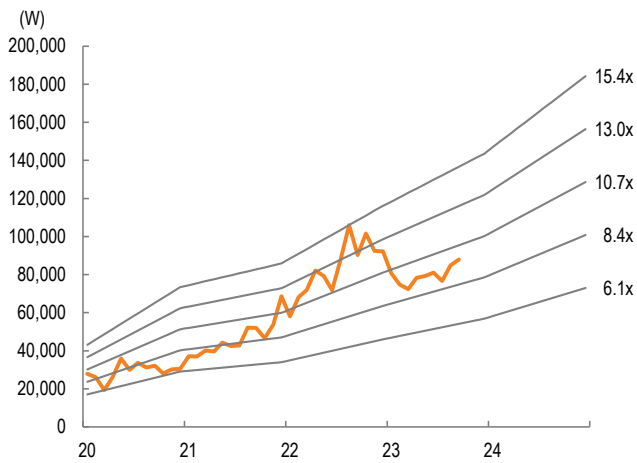
Source: Mirae Asset Securities Research

Table 25. LIG Nex1: P/B valuation trend

	2015	2016	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F
Market cap (Wbn)	2,277	1,771	1,316	813	695	671	1,509	2,028	1,877		
Share price (W)	103,500	80,500	59,800	36,950	31,600	30,500	68,600	92,200	85,300		
P/B (ending, x)	3.9	2.8	2.2	1.3	1.1	1.0	2.0	2.2	1.7	1.5	1.3
P/B (high, x)	4.7	4.5	3.4	2.0	1.5	1.2	2.1	2.7	1.9	1.7	1.4
P/B (low, x)	2.4	2.2	2.0	0.9	0.9	0.5	0.9	1.3	1.4	1.2	1.0
P/B (avg., x)	3.7	3.3	2.8	1.4	1.2	0.9	1.3	1.9	1.6	1.4	1.2
BPS (W)	26,231	28,711	26,956	29,552	28,817	30,956	34,937	42,750	48,786	56,639	67,141
EPS (W)	4,043	3,502	(431)	203	145	2,631	4,775	5,588	7,553	9,340	11,988
YoY (%)	56.3	(13.4)	TTR	TTB	(28.5)	1,717.1	81.5	17.0	35.2	23.7	28.4
ROE (%)	17.7	12.7	(1.4)	0.7	0.5	8.9	14.6	14.5	16.6	17.8	19.4

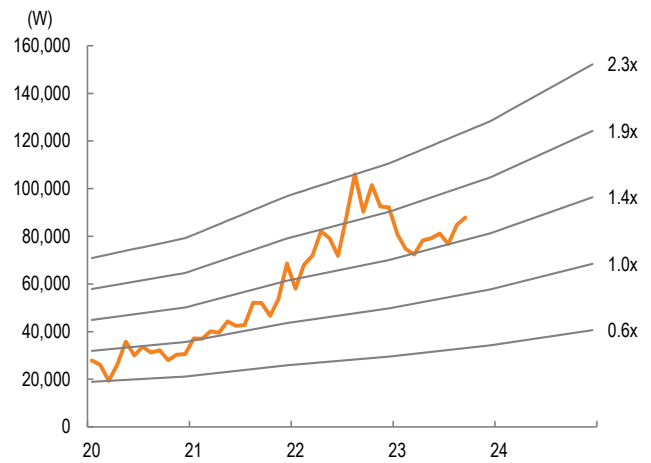
Source: Company data, Mirae Asset Securities Research

Figure 154. LIG Nex1: 12-month forward P/E band chart



Source: QuantiWise, Mirae Asset Securities Research

Figure 155. LIG Nex1: 12-month forward P/B chart



Source: QuantiWise, Mirae Asset Securities Research

Table 26. Peer comparison

Company	Market cap (US\$bn)	Return (%)		Revenue growth (%)		OP margin (%)		P/E (x)		P/B (x)		ROE (%)		EPS CAGR (%)
		1M	YTD	24F	25F	24F	25F	24F	25F	24F	25F	24F	25F	21-25F
Korean defense														
Hanwha Aerospace	4.2	1.3	48.1	13.5	7.8	7.5	8.2	17.3	13.9	1.6	1.4	9.3	10.6	72.6
KAI	3.6	4.9	-3.2	-0.3	21.4	6.9	8.4	22.6	16.0	2.6	2.3	12.1	15.1	42.5
Hyundai Rotem	2.4	3.0	4.0	13.9	14.8	6.5	7.4	23.1	17.4	1.8	1.6	10.9	12.8	65.9
Hanwha Systems	1.8	-5.4	18.7	6.6	6.8	5.0	6.0	18.4	15.3	1.1	1.1	6.4	7.3	-18.1
LIG Nex1	1.4	14.8	-6.5	18.2	12.9	8.9	10.2	9.1	7.1	1.5	1.3	17.8	19.4	37.1
Guided weapons/C4ISR														
RTX	109.4	-12.4	-25.5	8.4	7.3	12.0	12.8	13.8	11.4	1.5	1.5	11.0	12.9	26.9
Northrop Grumman	66.7	2.4	-19.3	5.6	5.6	10.8	11.5	17.8	15.7	4.0	3.7	22.8	24.5	19.1
BAE Systems	39.7	9.5	23.2	5.8	6.8	10.9	11.1	15.7	14.4	2.6	2.5	16.7	17.6	13.5
L3Harris	33.1	-3.5	-15.9	8.8	5.4	15.0	15.5	13.1	12.1	1.8	1.7	11.9	12.7	34.8
Elbit Systems	9.0	0.3	23.0	7.1	1.3	7.8	7.6	25.8	23.1	N/A	N/A	N/A	N/A	N/A
Kongsberg Gruppen	7.6	9.1	15.8	9.0	9.7	11.8	12.1	20.2	17.9	4.9	4.5	24.7	25.9	27.4

Source: Mirae Asset Securities Research

2Q23 review and earnings outlook

2Q23 review

For 2Q23, LIG Nex1 posted below-consensus results, with revenue of W545.8bn (+11.3% YoY) and operating profit of W40.2bn (-14.7% YoY; OP margin of 7.4%). OP margin narrowed due to: 1) one-off expenses (increased revenue mix of the development business in 1H23 and provisioning against losses); and 2) the absence of revenue resulting from the transition of some projects from mass to batch production. Excluding one-off items, OP margin came in at 8.5%.

By division, precision guided munition (PGM) revenue contracted W32.2bn YoY; avionics/electronic warfare revenue declined W6.1bn YoY; intelligence, surveillance, and reconnaissance (ISR) revenue grew W22.2bn YoY; and command, control, and communications (C4I) revenue grew W67.4bn YoY. Top line contracted mainly due to a temporary transition from mass to batch production and should recover with the signing of follow-up contracts.

Domestic revenue climbed 3.4% YoY to W459.5bn, and exports surged 87.4% YoY to W86.3bn. The recognition of revenue from trunked radio system (TRS) exports to Indonesia contributed to revenue growth. Exports represented 15.8% of revenue in 2Q23 and should comfortably hit the full-year revenue share target of 18.8%.

Table 27. LIG Nex1: 2Q23 review

(Wbn)

	2Q22	1Q23	2Q23			Consensus	
			Actual	QoQ (%)	YoY (%)	Est.	Diff. (%)
Revenue	490	684	546	-20.2	11.3	566	-3.6
OP	47	32	40	25.6	-14.6	43.9	-8.5
NP	44	18	32	74.6	-28	33.5	-5.7
OP margin (%)	9.6	4.7	7.4	2.7	-2.2	7.8	-0.4
Net margin (%)	9.9	2.6	5.8	3.1	-4.1	5.9	-0.1
Revenue by business							
PGM	301	289	268	-7.3	-11.0		
ISR	69	77	91	18.0	32.1		
AEW	58	45	52	15.1	-10.5		
C4I	56	128	123	-4.2	121.0		
Other	7	7	12	65.0	76.8		
Revenue by region							
Domestic	444	440	459.5	4.4	3.4		
Exports	46	107	86.3	-19.1	87.4		
Exports as % of revenue	5.9	15.6	15.8	0.2	10.0		

Source: Company data, Mirae Asset Securities Research

Earnings outlook

For 2023, we expect LIG Nex1 to deliver revenue of W2.51tr (+13% YoY) and operating profit of W203.2bn (+13.4% YoY; OP margin of 8.1%).

While the company has received less investor attention than its peers due to a lack of Poland contract wins, it is set to become the biggest beneficiary of rising tensions around the globe. Notably, demand for anti-tank missiles and missile defense systems is surging in Europe and the Middle East, and demand for anti-ship missiles and missile defense systems is projected to grow in Southeast Asia. Indeed, following the export of Cheongung II missiles to the UAE, other countries in Europe, the Middle East, and Southeast Asia have shown interest in the firm's weapons, sending purchase offers.

LIG Nex1 expects exports to make up 16-18% of revenue in 2023 and 26%-28% of revenue in 2024, a marked increase from the 10-year average of 10%. If the firm's export guidance is met, we think the resulting top-line growth and bottom-line expansion could lead to a re-rating of its stock.

The development of the L-SAM and LAMD (iron dome-style) missile defense systems are also progressing smoothly. The L-SAM system, scheduled to be completed in 2024, is already drawing interest from potential buyers overseas.

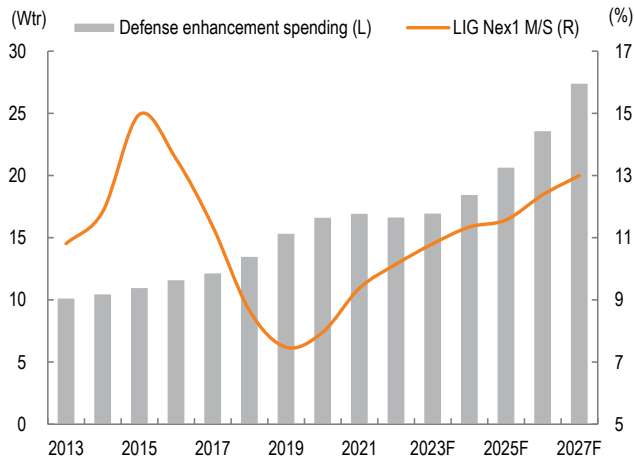
Table 28. LIG Nex1: Quarterly and annual earnings

(Wbn)

Region		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23F	4Q23F	2022	2023F	2024F	2025F
Order backlog		7,921	8,112	7,956	12,265	11,822	12,213	12,196	14,666	12,265	14,666	21,794	23,286
Revenue	Total	427	490	696	608	547	546	690	727	2,221	2,509	2,962	3,413
	Domestic	380	444	475	515	440	460	506	576	1,815	1,982	2,152	2,536
	Exports	47	46	221	92	107	86	184	150	406	528	809	877
Growth (%)	Total	21.9	11.5	51.6	6.1	28.0	11.3	-0.8	19.5	21.9	13.0	18.0	15.2
	Domestic	18.4	4.9	7.9	-7.1	15.8	3.4	6.5	11.8	4.3	9.2	8.6	17.9
	Exports	59.8	183.1	1,088.4	401.1	127.4	87.4	-16.4	62.6	29.9	53.4	8.3	33.8
OP		50	47	58	23	68	40	54	41	179	203	264	347
YoY (%)		294.5	63.8	64.4	14.9	35.1	-14.6	-8.0	77.5	84.3	13.4	29.8	31.8
OP margin (%)		11.8	9.6	8.4	3.8	12.5	7.4	7.8	5.6	8.1	8.1	8.9	10.2
NP		42	44	76	(38)	60	32	43	32	123	166	205	264
YoY (%)		109.8	96.7	85.6	TTR	43.1	-28.4	-43.6	TTB	117.6	95.7	-16.1	51.5
Net margin (%)		9.8	9.0	10.9	-6.3	10.9	5.8	6.2	4.4	5.5	6.6	6.9	7.7

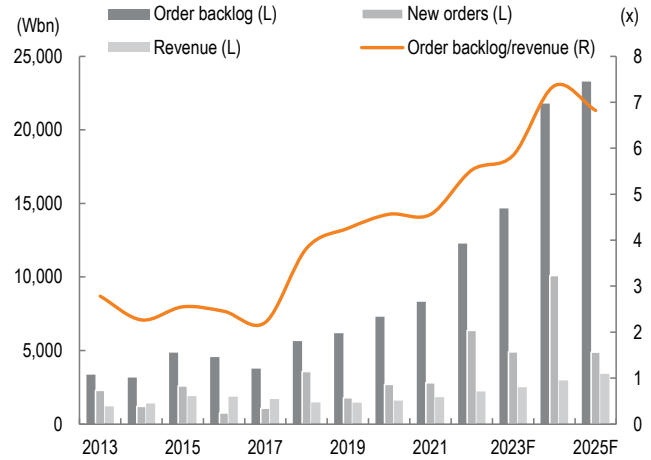
Source: Company data, Mirae Asset Securities Research

Figure 156. Defense enhancement spending and share of LIG Nex1



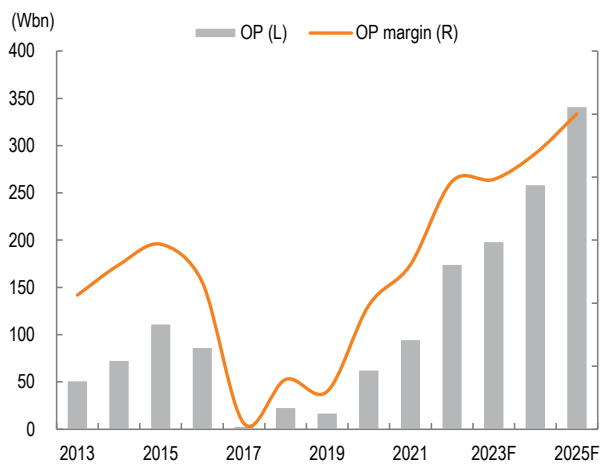
Source: Company data, Mirae Asset Securities Research

Figure 157. LIG Nex1: Order backlog, new orders, and revenue



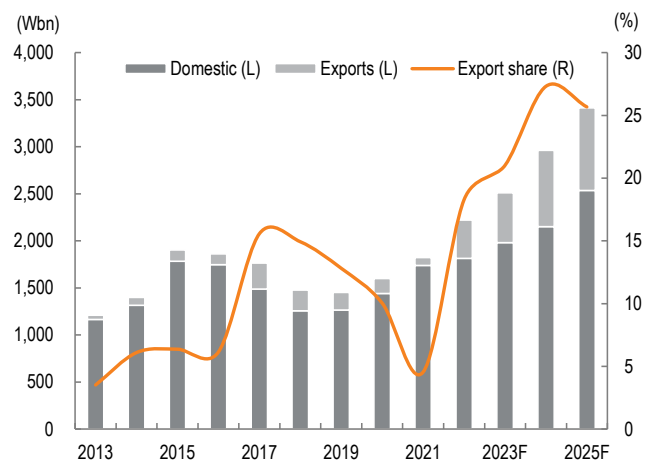
Source: Company data, Mirae Asset Securities Research

Figure 158. LIG Nex1: OP and OP margin



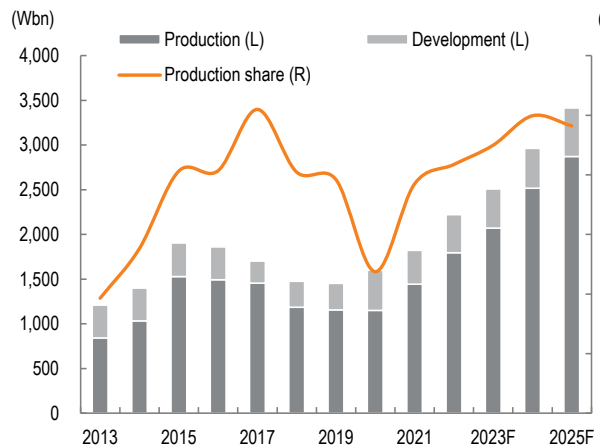
Source: Company data, Mirae Asset Securities Research

Figure 159. LIG Nex1: Revenue share of exports



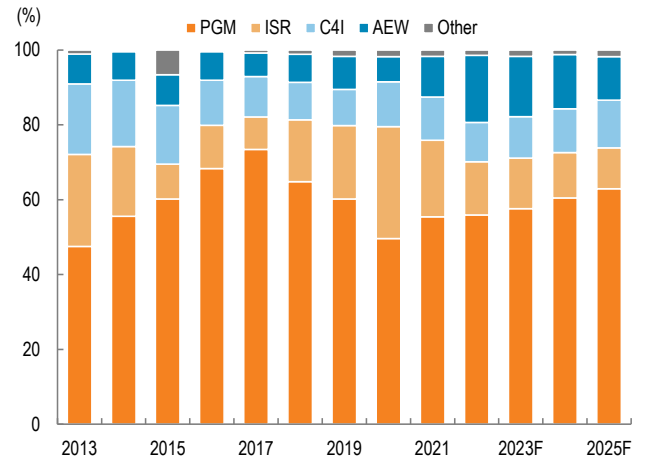
Source: Company data, Mirae Asset Securities Research

Figure 160. LIG Nex1: Revenue share of mass production business



Source: Company data, Mirae Asset Securities Research

Figure 161. LIG Nex1: Revenue breakdown by business



Source: Company data, Mirae Asset Securities Research

Company overview

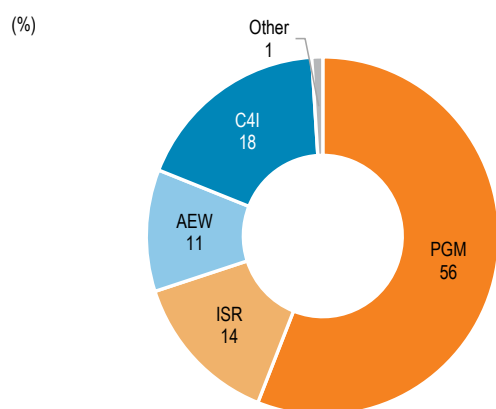
The only domestic manufacturer of precision-guided weapons

Established in 1976 as Goldstar Precision Industrial, LIG Nex1 was designated by the government as a combat/ship radar developer in 1990 and has since grown to become the only Korean manufacturer of precision-guided weapons and electronic warfare systems.

The company engages in advanced weaponry R&D/mass production, with a product lineup that includes PGM, ISR, AEW, and C4I systems. The firm holds a monopoly in guided weapons and competes with Hanwha Systems in radar/surveillance systems. The PGM unit contributed 56% of revenue in 2021; key products include the Cheongung II M-SAM system and the Hyungung anti-tank guided missile.

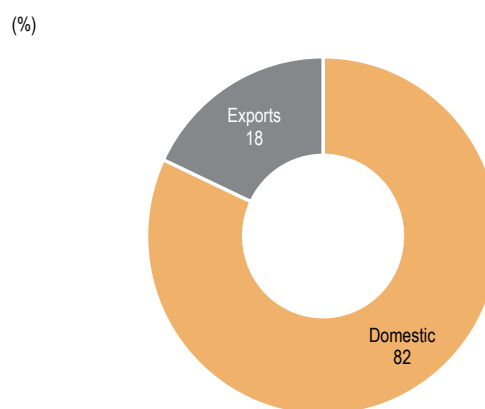
As a pure defense play, the company's earnings are highly correlated with the government's defense enhancement spending. Domestic sales represent 81.7% of total revenue and exports 18.3%. The revenue share of exports has been increasing steadily amid the supply of weapons to the UAE, Saudi Arabia, the Philippines, Indonesia, etc.

Figure 162. LIG Nex1: Revenue breakdown by business (2022)



Source: Company data, Mirae Asset Securities Research

Figure 163. LIG Nex1: Revenue breakdown by region (domestic/exports) (2022)



Source: Company data, Mirae Asset Securities Research

LIG Nex1 (079550 KS)

Income statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Revenue	2,216	2,507	2,962	3,345
Cost of revenue	1,891	2,128	2,490	2,779
GP	325	379	472	566
SG&A expenses	146	175	208	225
OP (adj.)	179	203	264	341
OP	179	203	264	341
Non-operating profit	-21	8	-3	-7
Net financial income	-3	0	-3	-6
Net income from associates	2	0	0	0
Pretax profit	158	211	261	334
Income tax	35	45	55	71
Profit from continuing operations	123	166	205	264
Profit from discontinued operations	0	0	0	0
NP	123	166	205	264
Attributable to owners	123	166	205	264
Attributable to minority interests	0	0	0	0
Total comprehensive income	198	165	205	264
Attributable to owners	198	165	205	264
Attributable to minority interests	0	0	0	0
EBITDA	232	270	333	412
FCF	408	61	70	235
EBITDA margin (%)	10.5	10.8	11.2	12.3
OP margin (%)	8.1	8.1	8.9	10.2
Net margin (%)	5.6	6.6	6.9	7.9

Balance sheet (summarized)

(Wbn)	2022	2023F	2024F	2025F
Current assets	1,820	2,218	2,389	2,739
Cash & equivalents	251	363	228	366
AR & other receivables	233	256	278	293
Inventory	222	266	314	347
Other current assets	1,114	1,333	1,569	1,733
Non-current assets	1,187	1,241	1,284	1,324
Investments in associates	9	11	13	14
PP&E	845	889	919	946
Intangible assets	171	190	201	212
Total assets	3,007	3,459	3,673	4,063
Current liabilities	1,895	2,262	2,302	2,460
AP & other payables	71	81	92	100
Short-term financial liabilities	244	441	293	252
Other current liabilities	1,580	1,740	1,917	2,108
Non-current liabilities	177	129	130	132
Long-term financial liabilities	120	70	70	70
Other non-current liabilities	57	59	60	62
Total liabilities	2,072	2,391	2,432	2,591
Equity attributable to owners	935	1,068	1,241	1,472
Capital stock	110	110	110	110
Capital surplus	142	142	142	142
Retained earnings	561	693	866	1,097
Minority interests	0	0	0	0
Shareholders' equity	935	1,068	1,241	1,472

Cash flow statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Operating cash flow	453	132	160	325
NP	123	166	205	264
Non-cash income/expenses	129	115	128	149
Depreciation	46	58	61	63
Amortization	7	9	9	9
Other	76	48	58	77
Chg. in working capital	207	-104	-115	-10
Chg. in AR & other receivables	-92	-8	-18	-12
Chg. in inventory	36	-46	-47	-33
Chg. in AP & other payables	-108	-2	3	2
Income tax	-1	-42	-55	-71
Cash flow from investing activities	-33	-108	-113	-112
Chg. in PP&E	-46	-71	-90	-90
Chg. in intangible assets	-29	-26	-20	-20
Chg. in financial assets	-9	-3	-3	-2
Other	51	-8	0	0
Cash flow from financing activities	-244	85	-180	-74
Chg. in financial liabilities	-182	148	-148	-41
Chg. in equity	0	0	0	0
Dividends	-26	-33	-33	-33
Other	-36	-30	1	0
Chg. in cash	176	112	-135	138
Beginning balance	74	251	363	228
Ending balance	251	363	228	366

Source: Company data, Mirae Asset Securities Research estimates

Key valuation metrics/ratios

	2022	2023F	2024F	2025F
P/E (x)	16.5	11.3	9.1	7.1
P/CF (x)	8.0	6.7	5.6	4.5
P/B (x)	2.2	1.7	1.5	1.3
EV/EBITDA (x)	9.1	7.4	6.0	4.4
EPS (W)	5,588	7,553	9,340	11,988
CFPS (W)	11,462	12,760	15,141	18,749
BPS (W)	42,750	48,786	56,639	67,141
DPS (W)	1,500	1,500	1,500	1,500
Dividend payout ratio (%)	26.6	19.7	15.9	12.4
Dividend yield (%)	1.6	1.8	1.8	1.8
Revenue growth (%)	21.8	13.1	18.2	12.9
EBITDA growth (%)	50.6	16.3	23.5	23.8
OP growth (%)	83.9	13.5	30.0	29.2
EPS growth (%)	17.0	35.2	23.7	28.4
AR turnover (x)	14.1	12.8	13.9	14.6
Inventory turnover (x)	10.2	10.3	10.2	10.1
AP turnover (x)	22.1	58.5	62.6	65.3
ROA (%)	4.4	5.1	5.8	6.8
ROE (%)	14.5	16.6	17.8	19.4
ROIC (%)	13.1	14.5	16.1	19.2
Debt-to-equity ratio (%)	221.6	223.9	196.0	176.1
Current ratio (x)	96.0	98.1	103.8	111.4
Net debt-to-equity ratio (%)	10.0	11.8	9.0	-4.7
Interest coverage ratio (x)	13.7	-41.3	-27.4	-48.9

Mirae Asset Securities Co., Ltd.

Dong-ho Jeong dongho.jeong@miraeasset.com



012450 KS • Defense/Aerospace

Hanwha Aerospace

Stepping onto the global stage

(Initiate)

Buy

Target price
W150,000

Upside
37.2%

Current price (9/19/23)
W109,300

KOSPI	2,559.21	Market cap (Wbn)	5,534	Shares outstanding (mn)	51	Foreign ownership (%)	33.0
-------	----------	------------------	-------	-------------------------	----	-----------------------	------

Report summary

Initiate with Buy and TP of W150,000

We initiate our coverage on Hanwha Aerospace with a Buy rating and target price of W150,000. We derived our target price by applying a P/B of 2.0x—a 20% discount to the average 2024F P/B of global peers—to our 2024F BPS of W75,597.

Investment points

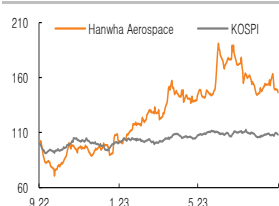
We highlight three key investment points: 1) revenue recognition for gap filler deliveries to Poland in 2H23; 2) continued export momentum for K9 self-propelled howitzers; and 3) export potential for a wide range of defense products, including Redback, Chunmoo, and K30 Biho systems.

2Q23 review and earnings outlook

For 2Q23, Hanwha Aerospace reported revenue of W1.79tr (+23.4% YoY) and operating profit of W83.1bn (-4.7% YoY). Despite solid top-line growth, operating profit contracted due to a void in gap filler (Poland) revenue and an increase in SG&A/labor expenses. For 2023 as a whole, we look for revenue of W8.52tr (+22.3% YoY) and operating profit of W634.5bn (+68.2% YoY; OP margin of 7.4%).

Key data

Price performance



(%)	1M	6M	12M
Absolute	1.6	14.9	48.1
Relative	-0.6	7.6	36.3

Earnings and valuation metrics

(Dec.)	2021	2022	2023F	2024F	2025F
Revenue (Wbn)	5,541	6,540	8,520	9,674	10,431
OP (Wbn)	277	377	634	726	858
OP margin (%)	5.0	5.8	7.4	7.5	8.2
NP (Wbn)	253	201	821	343	426
EPS (W)	4,989	3,967	16,212	6,767	8,418
ROE (%)	9.2	7.0	25.6	9.3	10.6
P/E (x)	9.6	18.6	6.7	16.2	13.0
P/B (x)	0.8	1.3	1.6	1.4	1.3
Dividend yield (%)	1.5	1.4	0.9	0.9	0.9

Notes: Under consolidated K-IFRS; NP is attributable to owners of the parent

Source: Company data, Mirae Asset Securities Research estimates

Recommendation and valuation

Initiate with Buy and TP of W150,000

We initiate our coverage on Hanwha Aerospace with a Buy rating and target price of W150,000. We derived our target price by applying a P/B of 2.0x to our 2024F BPS of W75,597. Our target multiple represents a 20% discount to the average 2024F P/B of global peers.

Hanwha Aerospace's order backlog stands at W52tr, the highest level on record. In 2H23, we expect earnings to turn around, backed by revenue recognition for gap filler deliveries to Poland. Momentum related to K9 self-propelled howitzer exports should continue. Additional export deals in India and Romania have also emerged as a strong possibility. The medium/long-term outlook appears bright, with the company set to supply its K9A2 artillery system to the British Army in 2025 under the UK's Mobile Fires Platform (MFP) program. Other upcoming contracts include the Australia Redback deal (estimated at W2-3tr) and the Poland K9/Chunmoo deals (estimated at US\$3.5bn). We also see a number of potential contracts ahead, including in Romania (Chunmoo) and Saudi Arabia (K30 Biho).

However, despite having realigned its business structure, Hanwha Aerospace still has many features of a holding company. This has inevitably led to cash outflows, including an investment in Hanwha Futureproof (W655.7bn) and participation in Hanwha Ocean's rights offering (W385.3bn). In light of this, we applied a 20% discount to our valuation. That said, we see ample potential for the discount to be removed if synergies between the defense business and subsidiaries begin to materialize.

Table 29. Hanwha Aerospace: TP calculation

	Value	Notes
Target price (W)	150,000	
Current price (W)	109,300	
Upside (%)	37.2	
Target P/B (x)	2.0	20% discount to the avg. 2024F P/B of global peers
2024F BPS (W)	75,597	
2024F ROE (%)	9.3	

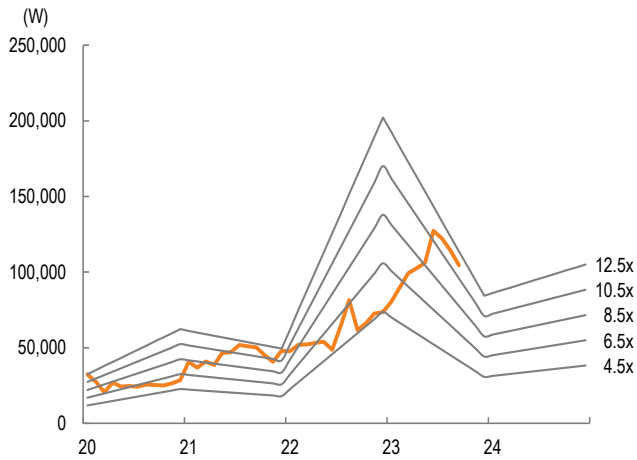
Source: Mirae Asset Securities Research

Table 30. Hanwha Aerospace: P/B valuation trend

	2015	2016	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F
Market cap (Wbn)	1,889	2,309	1,870	1,691	1,807	1,443	2,430	3,726	5,534		
Share price (W)	35,550	43,450	35,550	32,500	35,050	28,500	48,000	73,600	109,300		
P/B (ending) (x)	0.8	1.0	0.9	0.7	0.7	0.6	0.8	1.3	1.6	1.4	1.3
P/B (high) (x)	1.0	1.6	1.3	0.8	0.9	0.7	1.0	1.5	2.2	2.0	1.8
P/B (low) (x)	0.5	0.7	0.8	0.5	0.6	0.3	0.5	0.7	0.9	0.9	0.8
P/B (avg.) (x)	0.7	1.1	1.0	0.6	0.7	0.5	0.8	1.0	1.5	1.4	1.3
BPS (W)	42,224	44,025	41,433	45,535	48,217	51,318	57,109	56,587	70,066	75,597	82,957
EPS (W)	108	6,498	(913)	619	2,555	2,388	4,989	3,967	16,212	6,767	8,418
YoY (%)	TTB	5,917.1	TTR	TTB	313.1	(6.5)	108.9	(20.5)	308.7	(58.3)	24.4
ROE (%)	0.3	15.1	(2.1)	1.4	5.4	4.8	9.2	7.0	25.6	9.3	10.6

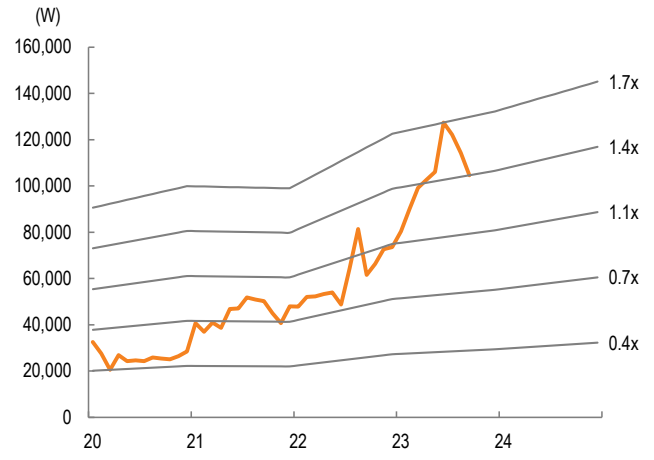
Source: Company data, Mirae Asset Securities Research

Figure 164. Hanwha Aerospace: 12-month forward P/E band chart



Source: QuantiWise, Mirae Asset Securities Research

Figure 165. Hanwha Aerospace: 12-month forward P/B band chart



Source: QuantiWise, Mirae Asset Securities Research

Table 31. Peer comparison

Company	Market cap (US\$bn)	Return (%)		Revenue growth (%)		OP margin (%)		P/E (x)		P/B (x)		ROE (%)		EPS CAGR (%)
		1M	YTD	24F	25F	24F	25F	24F	25F	24F	25F	24F	25F	21-25F
Korean defense														
Hanwha Aerospace	4.2	1.3	48.1	13.5	7.8	7.5	8.2	16.2	13.0	1.4	1.3	9.3	10.6	72.6
KAI	3.6	4.9	-3.2	-0.3	21.4	6.9	8.4	22.6	16.0	2.6	2.3	12.1	15.1	42.5
Hyundai Rotem	2.4	3.0	4.0	13.9	14.8	6.5	7.4	23.1	17.4	1.8	1.6	10.9	12.8	65.9
Hanwha Systems	1.8	-5.4	18.7	6.6	6.8	5.0	6.0	18.4	15.3	1.1	1.1	6.4	7.3	-18.1
LIG Nex1	1.4	14.8	-6.5	18.2	12.9	8.9	10.2	9.1	7.1	1.5	1.3	17.8	19.4	37.1
Land defense														
General Dynamics	61.3	0.0	-9.6	6.5	3.6	11.3	11.7	15.0	13.8	2.8	2.6	20.1	20.7	8.1
BAE Systems	39.7	9.5	23.2	5.8	6.8	10.9	11.1	15.7	14.4	2.6	2.5	16.7	17.6	13.5
Rheinmetall	12.3	5.7	41.5	22.4	15.6	13.6	14.0	13.8	11.5	3.0	2.6	24.9	25.2	25.8
Oshkosh	6.4	-0.3	11.8	5.8	-1.9	8.4	9.2	10.7	9.8	1.7	1.6	16.7	16.9	40.6
Aircraft engines														
RTX (P&W)	109.4	-12.4	-25.5	8.4	7.3	12.0	12.8	13.8	11.4	1.5	1.5	11.0	12.9	26.9
MTU Aero Engines	9.7	-16.8	-17.0	14.3	10.0	12.3	12.7	14.0	12.4	2.6	2.4	19.5	20.2	40.9
GE	126.9	4.3	78.3	8.7	7.8	11.5	13.1	27.3	20.3	3.4	3.3	15.2	17.1	N/A
CCTV stocks														
Hikvision	40.7	-6.0	-8.2	14.0	14.3	19.7	20.6	16.5	14.0	3.3	2.8	21.2	22.0	11.3
Sony	108.6	5.9	26.8	2.3	2.2	11.1	11.9	15.4	14.0	1.8	1.6	12.4	12.1	17.7

Source: Bloomberg, Mirae Asset Securities Research

2Q23 review and earnings outlook

2Q23 review

For 2Q23, Hanwha Aerospace reported revenue of W1.79tr (+23.4% YoY) and operating profit of W83.1bn (-4.7% YoY), missing consensus estimates. Overall top line was driven by land systems revenue, which surged 80% YoY to W600.1bn thanks to the consolidation of Hanwha Munitions. The company also saw solid revenue contributions from Hanwha Systems (W439.5bn; +39% YoY) and Hanwha Vision (W243.6bn; +11% YoY). However, operating profit contracted YoY, hurt by: 1) a void in gap filler (Poland) revenue; 2) an unfavorable comparison at the aerospace division; 3) higher development costs; and 4) an increase in SG&A/labor expenses due to merger/hiring costs.

Looking to 2H23, we expect the company to recognize revenue for three Chunmoo systems in Poland in 4Q23. Additional K9 systems could also be delivered as early as 4Q23. Meanwhile, a second deal for 100 K9 systems and several dozen Chunmoo systems in Poland will be concluded by the end of the year. At the aerospace division, Pratt & Whitney's (P&W) GTF engine recall could lead to losses, and the cause of the problem is still under investigation. But given that Hanwha Aerospace's stake is only 2%, risks should be limited even in a worst-case scenario.

Meanwhile, Hanwha Aerospace has been selected as the preferred bidder for the Australian Army's IFV program, with its in-house-developed Redback beating out Germany's Lynx. The deal is particularly meaningful, as it will allow the company to establish a track record in a developed market. A total of 129 IFVs will be supplied, and while the value of the deal has yet to be confirmed, we estimate it to be around W2-3tr. Assuming the contract is finalized, initial shipments will begin in 2027, and deliveries will be completed by the end of 2028.

Table 32. Hanwha Aerospace: 2Q23 review

(Wbn)

	2Q22	1Q23	2Q23			Consensus	
			Preliminary	QoQ (%)	YoY (%)	Est.	Diff. (%)
Revenue	1,457	1,927	1,798	-6.7	23.4	1,981	-9.2
OP	87	229	83	-63.6	-4.7	122	-32.1
NP	28	475	309	-35.1	1009.7	60	418.2
OP margin (%)	6.0	11.9	4.6	-7.2	-1.4	6.2	-1.6
Net margin (%)	1.9	24.7	17.2	-7.5	15.2	3.0	14.2
Revenue by division							
Aerospace	367	390	402	3.1	9.6		
Land systems	333	842	600	-28.7	80.4		
Hanwha Vision	256	274	284	3.8	11.0		
Hanwha Systems	511	440	611	39.0	19.6		
Satrec Initiative	21	24	39	62.5	86.8		
Defense as % of revenue	49	59	58				

Source: Company data, Mirae Asset Securities Research

Earnings outlook

For 2023 as a whole, we look for revenue of W8.52tr (+22.3% YoY) and operating profit of W634.5bn (+68.2% YoY; OP margin of 7.4%).

We believe the land systems division will remain the key driver of overall earnings. We expect the division to see strong earnings and order momentum in 2H23, given that defense budgets are typically concentrated in the second half of the year. For 2023, we forecast land systems revenue to grow strongly to W3.55tr (+73.4% YoY).

We forecast revenue from the aerospace division and Hanwha Vision to grow 11.5% and 14.9% YoY, respectively, in 2023. In the aerospace division, long-term agreement (LTA) revenue should increase on a pickup of the aviation industry, contributing to profit improvements. That said, we believe a more meaningful earnings turnaround will not come until 2027-28, given lingering supply chain issues amid labor shortages. For Hanwha Vision, we expect growth to remain solid in the coming years, with the ban of Chinese surveillance cameras in North America serving as a tailwind.

Table 33. Hanwha Aerospace: Quarterly and annual earnings forecasts

(Wbn)

		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23F	4Q23F	2022	2023F	2024F	2025F
Order backlog	Total	38,200	37,990	41,465	50,880	52,390	52,373	52,247	58,663	50,880	58,663	64,892	67,407
	Aerospace	24,870	24,799	25,816	24,860	26,478	26,879	26,981	27,708	24,860	27,708	29,044	30,178
	Land systems	7,252	7,185	9,839	19,777	19,723	19,467	19,351	24,057	19,777	24,057	28,421	29,258
	Hanwha Systems	5,917	5,839	5,650	5,987	5,940	5,807	5,705	6,591	5,987	6,591	7,026	7,468
	Satrec Initiative	161	167	159	256	250	220	211	307	256	307	400	502
Revenue	Total	1,378	1,671	1,398	2,518	1,927	1,798	1,913	2,882	6,965	8,519	9,674	10,431
	Aerospace	298	367	329	376	390	402	351	383	1,369	1,526	1,615	1,701
	Land systems	242	333	352	1,121	842	600	750	1,359	2,048	3,551.1	4,160	4,585
	Hanwha Vision	217	256	279	250	274	284	293	301	1,002	1,151	1,267	1,337
	Hanwha Systems	430	510	459	789	439	611	495	807	2,187	2,353	2,508	2,678
	Satrec Initiative	18	21	23	29	24	39	24	31	91	118	123	129
Growth (%)	Total	13.7	-0.9	-9.4	27.6	39.8	7.6	36.8	14.5	8.6	22.3	13.5	7.8
	Aerospace	-0.7	-11.1	2.8	-10.0	30.9	9.6	6.6	2.1	-5.6	11.5	5.8	5.4
	Land systems	-1.6	-7.0	9.2	106.8	247.2	80.4	113.4	21.2	39.5	73.4	17.2	10.2
	Hanwha Vision	44.6	45.3	53.5	45.8	25.9	11.0	4.9	20.5	47.5	14.9	10.0	5.6
	Hanwha Systems	17.1	5.0	-17.6	16.0	2.3	19.7	7.8	2.4	7.6	6.6	6.8	10.9
	Satrec Initiative	0.0	0.0	0.0	0.0	32.3	86.8	4.9	4.6	28.9	4.8	4.8	1.0
OP		47	87	64	178	229	83	99	224	377	634	726	858
	YoY (%)	10.6	11.2	-23.4	148.1	384.6	-4.7	54.0	25.4	36.1	68.2	14.4	18.3
	OP margin (%)	3.4	5.2	4.6	7.1	11.9	4.6	5.2	7.8	5.4	7.4	7.5	8.2
NP		38	28	89	46	409	263	41	108	201	821	343	426
	YoY (%)	-56.9	-63.1	52.2	52.8	967.7	847.7	-53.9	134.3	-20.5	308.7	-58.3	24.4
	Net margin (%)	2.8	1.7	6.3	1.8	21.2	14.6	2.1	3.7	2.9	9.6	3.5	4.1

Source: Company data, Mirae Asset Securities Research

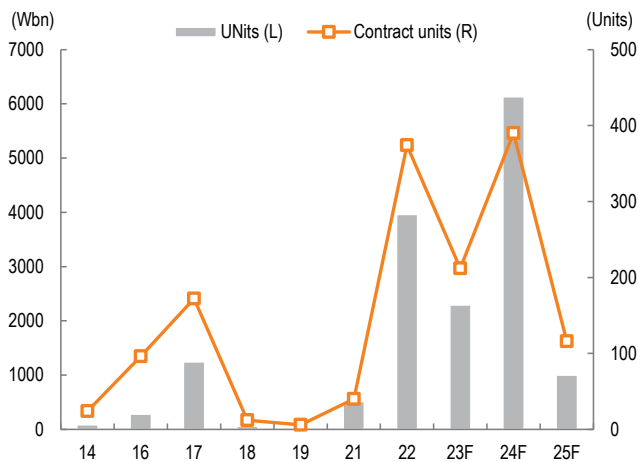
Table 34. K9 self-propelled howitzer exports

(Wbn)

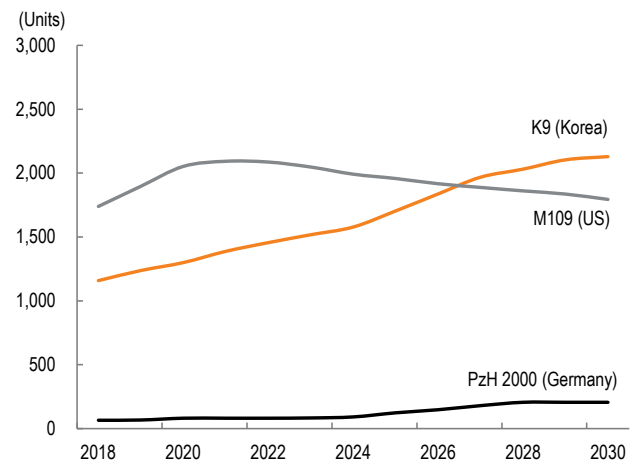
Destination	Year	Units	Value	ASP	Notes
Turkey	2001	280	1,300	4.6	K9 licensing/local production
Poland	2014	24	83	3.5	K9 chassis exports
Poland	2016	96	280	2.9	K9 chassis exports
Finland	2017	48	199	4.1	K9 second-hand exports
India	2017	100	898	9.0	K9 licensing/local production
Norway	2017	24	147	6.1	K9 finished product exports
Estonia	2018	12	58	4.8	K9 second-hand exports
Estonia	2019	6	29	4.8	Additional K9 purchases
Finland	2021	10	41	4.1	Five units delivered in 2021 and five in 2022
Australia	2021	30	474	15.8	K9 finished product exports
Egypt	2022년	120	842	7.0	K9 finished product exports and licensing/local production
Poland	2022	212	3,200	15.1	First executive contract of K9 finished product exports
Norway	2022	4	20	4.9	Additional K9 purchases
Finland	2022	38	187	4.9	Additional K9 purchases
Estonia	2023	12	48	4.0	Additional K9 purchases
India	2023F	100	870	8.7	Approved by India's Ministry of Defence; RFP to be issued following cost negotiations
Romania	2023F	54	1,518	28.1	Purchase pending parliamentary approval
Poland	23/24F	436	6,581	15.1	Second executive contract
UK	2025F	116	1,000	8.6	K942 proposed to replace AS90 self-propelled howitzers under MFP program
Vietnam	TBD	TBD	TBD	TBD	Interest expressed in K-9A1 during visit to Korea in Mar. 2023

Note: For Egypt and Australia, figures reflect only the K9 component of K9/K10/K11 package deals.

Source: Mirae Asset Securities Research

Figure 166. Hanwha Aerospace: K9 export trends and forecasts

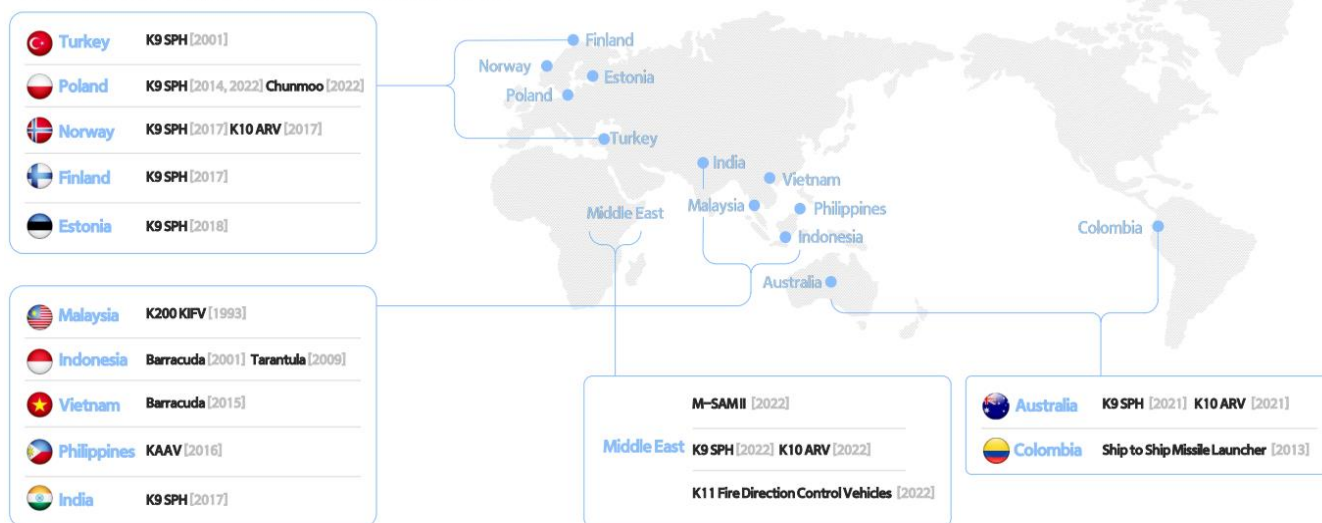
Source: Company data, media reports, Mirae Asset Securities Research

Figure 167. Competing self-propelled howitzer models: Units in operation

Source: The Military Balance, company order data, Mirae Asset Securities Research

Figure 168. Hanwha Aerospace: Export destinations

Hanwha Aerospace is expanding into the global markets based on the company's advanced technology and trustworthy quality products



Source: Company materials, Mirae Asset Securities Research

Figure 169. Hanwha Aerospace: Defense product lineup

Source: Company materials, Mirae Asset Securities Research

Company overview

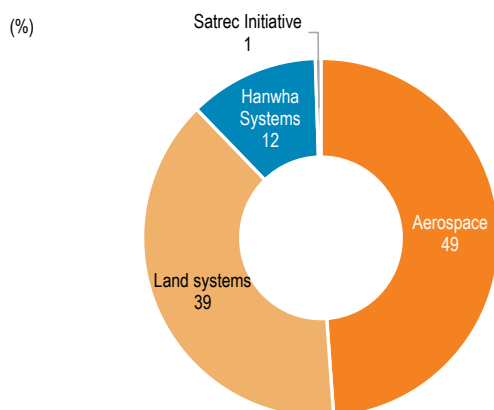
Korea's leading integrated defense company

Originally founded as Samsung Precision in Aug. 1977, Hanwha Aerospace adopted its current name after it was acquired by Hanwha Corp. in Jun. 2015. Building on its precision machinery technology, the company is engaged in a wide range of businesses, including aircraft engines, land systems, surveillance cameras, launch vehicles, and satellite systems.

In 2023, the company beefed up its defense business by merging with Hanwha Defense and Hanwha Munitions, while also acquiring Hanwha Ocean (formerly Daewoo Shipbuilding & Marine Engineering). With these deals, Hanwha Aerospace has become one of the world's leading integrated defense companies. Key products include the K9 self-propelled howitzer, the K239 Chunmoo multiple rocket launcher, the Redback IFV, the K21 IFV, and the K30 Biho.

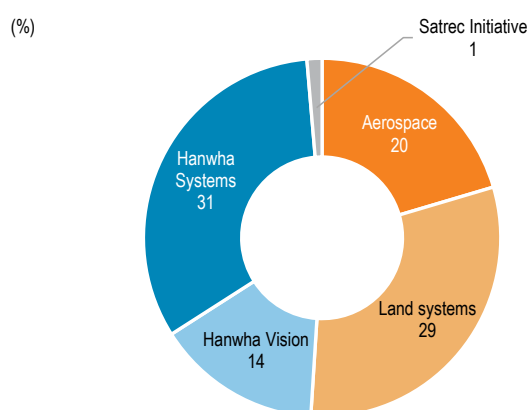
The company also supplies warheads and propulsion systems used in LIG Nex1's precision-guided munitions. Under a license agreement, the aerospace division manufactures the engines that run KAI's fixed-wing and rotary-wing products. Looking ahead, we expect the company to see synergies with Hanwha Ocean's specialty ship business. We believe Hanwha Aerospace's extensive defense lineup across land, sea, and air makes it one of the biggest beneficiaries of the growth of the defense industry.

Figure 170. Hanwha Aerospace: Order backlog by business division (2022)



Source: Company data, Mirae Asset Securities Research

Figure 171. Hanwha Aerospace: Revenue by business division (2022)



Source: Company data, Mirae Asset Securities Research

Hanwha Aerospace (012450 KS)

Income statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Revenue	6,540	8,520	9,674	10,431
Cost of revenue	5,190	6,559	7,468	7,961
GP	1,350	1,961	2,206	2,470
SG&A expenses	972	1,326	1,480	1,612
OP (adj.)	377	634	726	858
OP	377	634	726	858
Non-operating profit	-202	637	-100	-90
Net financial income	-33	-76	-100	-90
Net income from associates	-21	-90	0	0
Pretax profit	175	1,271	626	768
Income tax	60	296	163	192
Profit from continuing operations	115	975	463	576
Profit from discontinued operations	37	3	0	0
NP	152	978	463	576
Attributable to owners	201	821	343	426
Attributable to minority interests	-49	158	120	150
Total comprehensive income	109	967	463	576
Attributable to owners	218	848	408	508
Attributable to minority interests	-109	119	55	68
EBITDA	634	954	1,078	1,237
FCF	1,328	634	584	573
EBITDA margin (%)	9.7	11.2	11.1	11.9
OP margin (%)	5.8	7.4	7.5	8.2
Net margin (%)	3.1	9.6	3.5	4.1

Balance sheet (summarized)

(Wbn)	2022	2023F	2024F	2025F
Current assets	8,589	7,326	8,530	9,744
Cash & equivalents	3,043	898	1,256	1,557
AR & other receivables	1,428	1,510	1,670	1,863
Inventory	2,014	2,306	2,750	3,206
Other current assets	2,104	2,612	2,854	3,118
Non-current assets	6,568	9,835	10,203	10,497
Investments in associates	88	2,878	2,878	2,878
PP&E	2,987	3,369	3,632	3,828
Intangible assets	2,121	2,238	2,281	2,323
Total assets	15,157	17,162	18,732	20,242
Current liabilities	8,270	9,813	10,852	11,835
AP & other payables	853	814	1,020	1,131
Short-term financial liabilities	1,653	1,808	1,749	1,688
Other current liabilities	5,764	7,191	8,083	9,016
Non-current liabilities	2,963	2,601	2,731	2,736
Long-term financial liabilities	1,854	1,507	1,551	1,528
Other non-current liabilities	1,109	1,094	1,180	1,208
Total liabilities	11,234	12,414	13,584	14,571
Equity attributable to owners	2,863	3,547	3,828	4,200
Capital stock	266	266	266	266
Capital surplus	217	205	193	190
Retained earnings	2,020	2,782	3,074	3,450
Minority interests	1,061	1,201	1,321	1,471
Shareholders' equity	3,924	4,748	5,149	5,671

Cash flow statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Operating cash flow	1,524	1,264	1,164	1,123
NP	152	978	463	576
Non-cash income/expenses	673	-86	615	661
Depreciation	176	237	269	295
Amortization	82	83	83	84
Other	415	-406	263	282
Chg. in working capital	794	395	349	169
Chg. in AR & other receivables	-305	-102	-152	-191
Chg. in inventory	-277	-283	-444	-456
Chg. in AP & other payables	226	-112	165	62
Income tax	-147	-161	-163	-192
Cash flow from investing activities	-1,225	-2,605	-730	-684
Chg. in PP&E	-192	-614	-531	-491
Chg. in intangible assets	-148	-209	-126	-126
Chg. in financial assets	-48	1	-27	-17
Other	-837	-1,783	-46	-50
Cash flow from financing activities	216	-334	-227	-279
Chg. in financial liabilities	727	-254	-15	-84
Chg. in equity	-212	-12	-12	-3
Dividends	-35	-51	-51	-51
Other	-264	-17	-149	-141
Chg. in cash	515	-2,145	358	301
Beginning balance	2,528	3,043	898	1,256
Ending balance	3,043	898	1,256	1,557

Source: Company data, Mirae Asset Securities Research estimates

Key valuation metrics/ratios

	2022	2023F	2024F	2025F
P/E (x)	18.6	6.7	16.2	13.0
P/CF (x)	4.5	6.2	5.1	4.5
P/B (x)	1.3	1.6	1.4	1.3
EV/EBITDA (x)	8.1	9.5	8.1	6.9
EPS (W)	3,967	16,212	6,767	8,418
CFPS (W)	16,292	17,623	21,285	24,424
BPS (W)	56,587	70,066	75,597	82,957
DPS (W)	1,000	1,000	1,000	1,000
Dividend payout ratio (%)	33.3	5.2	10.9	8.8
Dividend yield (%)	1.4	0.9	0.9	0.9
Revenue growth (%)	18.0	30.3	13.5	7.8
EBITDA growth (%)	23.3	50.4	12.9	14.8
OP growth (%)	36.1	68.2	14.4	18.3
EPS growth (%)	-20.5	308.7	-58.3	24.4
AR turnover (x)	5.5	6.1	6.4	6.2
Inventory turnover (x)	3.6	3.9	3.8	3.5
AP turnover (x)	10.6	11.2	10.5	9.7
ROA (%)	1.2	6.1	2.6	3.0
ROE (%)	7.0	25.6	9.3	10.6
ROIC (%)	5.7	13.8	11.8	13.8
Debt-to-equity ratio (%)	286.3	261.4	263.8	256.9
Current ratio (x)	103.9	74.7	78.6	82.3
Net debt-to-equity ratio (%)	8.4	48.2	37.0	26.6
Interest coverage ratio (x)	4.7	4.5	5.7	6.8

Mirae Asset Securities Co., Ltd.

Dong-ho Jeong dongho.jeong@miraeasset.com



064350 KS • Defense

Hyundai Rotem

Waiting for the next Poland

(Initiate)

Buy

Target price

W37,000

Upside

25.2%

Current price (9/19/23)

W29,550

KOSPI	2,559.21	Market cap (Wbn)	3,225	Shares outstanding (mn)	109	Foreign ownership (%)	10.6
-------	----------	------------------	-------	-------------------------	-----	-----------------------	------

Report summary

Initiate with Buy and TP of W37,000

We initiate our coverage on Hyundai Rotem with a Buy rating and target price of W37,000. We derived our target price by applying a P/B of 2.2x—the 2024F average of global peers—to our 2024F BPS of W16,914.

Investment points

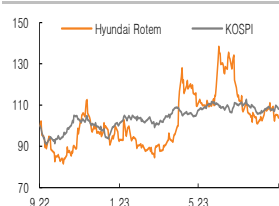
We highlight three key investment points: 1) mass production of K2 battle tanks and wheeled armored vehicles; 2) revenue recognition and additional export momentum related to K2 deliveries in Poland; and 3) growth of overseas revenue (which has higher margins) driven by the rail solutions division's Queensland Train Manufacturing Program (QTMP) contract win in Australia.

2Q23 review and earnings outlook

For 2Q23, Hyundai Rotem posted revenue of W986.8bn (+25.6% YoY) and operating profit of W67.2bn (+113.9% YoY; OP margin of 6.8%). Top-line growth was driven by revenue recognition for 11 K2 tank deliveries to Poland. For 2023 as a whole, we foresee revenue of W3.41tr (+7.9% YoY) and operating profit of W173bn (+17.3% YoY; OP margin of 5.1%).

Key data

Price performance



(%)	1M	6M	12M
Absolute	3.0	15.7	6.7
Relative	0.8	8.3	-1.8

Earnings and valuation metrics

(Dec.)	2021	2022	2023F	2024F	2025F
Revenue (Wbn)	2,873	3,163	3,410	3,884	4,459
OP (Wbn)	80	147	173	254	329
OP margin (%)	2.8	4.6	5.1	6.5	7.4
NP (Wbn)	67	198	131	190	253
EPS (W)	609	1,812	1,196	1,741	2,318
ROE (%)	5.0	14.1	8.2	10.9	12.8
P/E (x)	34.1	15.7	24.7	17.0	12.7
P/B (x)	1.8	2.0	1.9	1.7	1.5
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0

Notes: Under consolidated K-IFRS; NP is attributable to owners of the parent

Source: Company data, Mirae Asset Securities Research estimates

Recommendation and valuation

Initiate with Buy and TP of W37,000

We initiate our coverage on Hyundai Rotem with a Buy rating and target price of W37,000. We derived our target price by applying a P/B of 2.2x—the 2024F average of global peers—to our 2024F BPS of W16,914.

The defense solutions division is currently the primary driver of overall earnings. Looking ahead, domestic revenue should increase on the mass production of K2 tanks (fourth batch) and wheeled armored vehicles. Exports should also grow strongly, supported by K2 tank deliveries in Poland (18 in 2023, 56 in 2024, and 96 in 2025). A second agreement with Poland (likely for 180 tanks) could be concluded before the end of the year. If production proceeds as agreed upon in the contract framework, the company will be producing a total of 1,180 K2 tanks (including for domestic mass production), achieving economies of scale.

That said, to sustain export momentum, the company faces an urgent need to secure additional contracts. Despite its excellent performance, the K2 tank faces stiff competition from the Leopard 2 and M1 Abrams battle tanks. The K2 lost out to Germany's Leopard 2 in Norway due to an offset agreement, while Lithuania also looks set to choose the Leopard 2 (54 tanks). Forthcoming projects in Romania, Oman, and Egypt bear close watching as potential export targets.

Table 35. Hyundai Rotem: TP calculation

	Value	Notes
Target price (W)	37,000	
Current price (W)	29,550	
Upside (%)	25.2	
Target P/B (x)	2.2	Avg. 2024F P/B of global peers
24F BPS (W)	16,914	
24F ROE (%)	10.9	

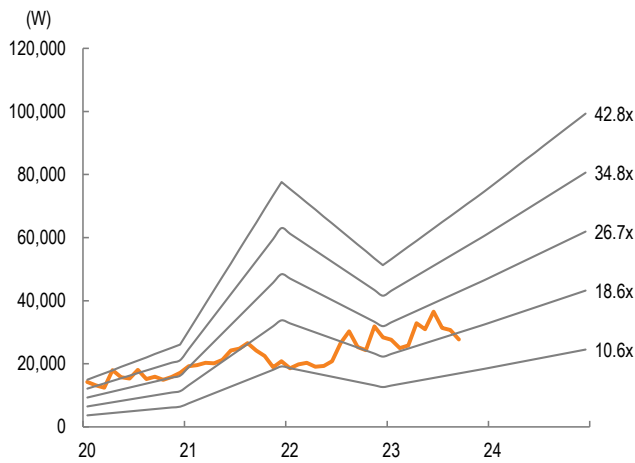
Source: Mirae Asset Securities Research

Table 36. Hyundai Rotem: P/B valuation trend

	2015	2016	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F
Market cap (Wbn)	1,245	1,543	1,594	2,367	1,326	1,877	2,270	3,100	3,225		
Share price (W)	14,650	18,150	18,750	27,850	15,600	17,200	20,800	28,400	29,550		
P/B (ending, x)	0.9	1.1	1.2	2.3	1.6	1.4	1.8	2.0	1.9	1.7	1.5
P/B (high, x)	1.4	1.5	1.5	3.7	3.1	1.6	2.3	2.4	2.7	2.4	2.1
P/B (low, x)	0.9	0.7	1.0	1.2	1.4	0.7	1.5	1.3	1.6	1.4	1.2
P/B (avg., x)	1.1	1.1	1.2	2.0	2.1	1.2	1.9	1.6	2.0	1.8	1.6
BPS (W)	15,985	16,376	15,811	12,282	9,695	12,493	11,847	13,930	15,173	16,914	19,232
EPS (W)	(3,602)	257	(557)	(3,539)	(4,168)	325	609	1,812	1,196	1,741	2,318
YoY (%)	RR	TTB	TTR	RR	RR	TTB	87.3	197.4	(34.0)	45.5	33.1
ROE (%)	(20.3)	1.6	(3.5)	(25.2)	(37.9)	2.8	5.0	14.1	8.2	10.9	12.8

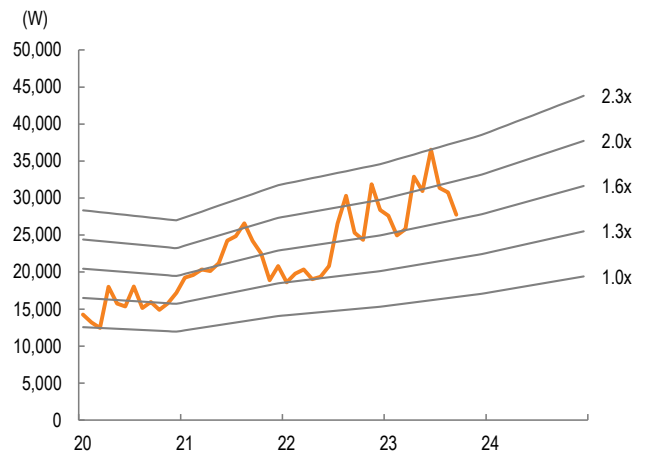
Source: Company data, Mirae Asset Securities Research

Figure 172. Hyundai Rotem: 12-month forward P/E band chart



Source: QuantiWise, Mirae Asset Securities Research

Figure 173. Hyundai Rotem: 12-month forward P/B band chart



Source: QuantiWise, Mirae Asset Securities Research

Table 37. Hyundai Rotem: Peer comparison

Company	Market cap (US\$bn)	Return (%)		Revenue growth (%)		OP margin (%)		P/E (x)		P/B (x)		ROE (%)		EPS CAGR (%)
		1M	YTD	24F	25F	24F	25F	24F	25F	24F	25F	24F	25F	
Domestic defense														
Hanwha Aerospace	4.2	1.3	48.1	13.5	7.8	7.5	8.2	17.3	13.9	1.6	1.4	9.3	10.6	72.6
KAI	3.6	4.9	-3.2	-0.3	21.4	6.9	8.4	22.6	16.0	2.6	2.3	12.1	15.1	42.5
Hyundai Rotem	2.4	3.0	4.0	13.9	14.8	6.5	7.4	23.1	17.4	1.8	1.6	10.9	12.8	65.9
Hanwha Systems	1.8	-5.4	18.7	6.6	6.8	5.0	6.0	18.4	15.3	1.1	1.1	6.4	7.3	-18.1
LIG Nex1	1.4	14.8	-6.5	18.2	12.9	8.9	10.2	9.1	7.1	1.5	1.3	17.8	19.4	37.1
Defense solutions														
General Dynamics	61.3	0.0	-9.6	6.5	3.6	11.3	11.7	15.0	13.8	2.8	2.6	20.1	20.7	8.1
BAE Systems	12.3	5.7	41.5	22.4	15.6	13.6	14.0	13.8	11.5	3.0	2.6	24.9	25.2	25.8
Rheinmetall	39.7	9.5	23.2	16.1	6.8	10.9	11.1	15.7	14.4	2.6	2.5	16.7	17.6	13.5
Rail solutions														
Siemens	117.3	2.1	5.8	7.1	5.2	14.5	15.1	13.4	12.0	1.9	1.8	14.8	15.3	25.8
CRRC	21.6	-4.9	14.5	10.1	8.4	6.9	7.1	11.9	10.3	1.0	0.9	8.2	8.9	8.1
Wabtec	19.4	-2.9	8.3	13.0	5.9	17.1	17.2	17.0	15.5	1.8	1.8	10.6	10.6	27.8

Source: Mirae Asset Securities Research

2Q23 review and earnings outlook

2Q23 review

For 2Q23, Hyundai Rotem posted revenue of W986.8bn (+25.6% YoY) and operating profit of W67.2bn (+113.9% YoY; OP margin of 6.8%), in line with the consensus. Overall top-line growth was driven by the defense solutions division, which saw revenue climb 112.8% YoY to W484.4bn on the back of revenue recognition for 11 K2 tank deliveries to Poland. On the other hand, the rail solutions division saw revenue slump 19.8% YoY to W392.5bn, due to the end of a major domestic rolling stock project.

Of the 180 K2 tanks included in the first contract with Poland, 21 have been delivered (10 in 2022 and 11 in 1H23), and another seven will be handed over in 3Q23. With the number of deliveries set to increase sharply in the coming years (56 in 2024 and 96 in 2025), we expect the defense solutions division to see meaningful top-line growth.

On its 2Q23 earnings call, management said that it was in talks to supply 180 tanks (estimated at US\$5.5bn) under its second agreement with Poland. The company also confirmed that the deal would be for upgrades and not for so-called gap fillers. Given Poland's strong commitment to rapidly deploy new weapons, we believe discussions regarding an additional 640 tanks (on top of the 360 tanks included in the first and second contracts) will also progress smoothly.

Table 38. Hyundai Rotem: 2Q23 review

(Wbn)

	2Q22	1Q23	2Q23			Consensus	
			Preliminary	QoQ (%)	YoY (%)	Est.	Diff. (%)
Revenue	786	684	987	44.3	25.6	1,006	-1.9
OP	31	32	67	109.4	116.1	69	-3.3
NP	26	18	53	190.1	105.1	42	23.7
OP margin (%)	3.9	4.7	6.8	2.1	2.8	6.9	-0.1
Net margin (%)	3.3	2.6	5.3	2.7	2.1	4.2	1.1
Revenue by division							
Rail solutions	489	369	393	6.3	-19.7		
Defense solutions	228	260	484	86.3	112.8		
Eco plants	69	55	110	99.3	59.0		
Defense as % of revenue	29.0	38.0	49.1	11.1	20.1		

Source: Company data, Mirae Asset Securities Research

Earnings outlook

For 2023, we expect Hyundai Rotem to deliver revenue of W3.41tr (+7.8% YoY) and operating profit of W173bn (+17.3% YoY; OP margin of 5.1%).

The rail solutions division has won Australia's QTMP contract (W1.22tr). Given that overseas projects are bigger and more profitable than domestic projects, the company should see medium/long-term top-line growth and profit improvements as revenue recognition for the project gets fully underway.

If the defense solutions division seals a second agreement with Poland (expected to be for 180 tanks worth W4.5tr), this will likely fill roughly six years' worth of production. The key question is whether the company can land additional K2 deals after Poland. The K9 self-propelled howitzer and the FA-50 fighter have both nabbed additional export contracts after Poland, but the K2 tank has yet to do so. For this reason, much attention will be on Romania's main battle tank acquisition contract (280 tanks).

Table 39. Hyundai Rotem: Quarterly and annual earnings forecasts

		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23F	4Q23F	2022	2023F	2024F	2025F
Order backlog	Total	9,981	9,523	14,465	13,089	14,314	16,604	17,087	21,827	13,089	21,827	26,546	30,734
	Rail solutions	7,975	7,683	8,040	7,462	8,280	9,988	9,966	9,823	7,462	9,823	10,230	11,338
	Defense solutions	1,590	1,433	6,094	5,275	5,502	5,971	6,429	11,199	5,275	11,199	15,106	17,772
	Eco plants	417	407	331	352	532	646	692	806	352	806	1,210	1,624
Revenue	Total	677	786	783	918	684	987	876	863	3,163	3,410	3,884	4,459
	Rail solutions	433	489	463	394	369	392	453	596	1,779	1,810	1,641	1,700
	Defense solutions	183	228	206	443	260	484	317	194	1,059	1,256	1,860	2,327
	Eco plants	62	69	114	80	55	110	106	73	325	344	384	432
Growth (%)	Total	3.7	10.6	10.2	15.0	1.0	25.6	11.9	-6.0	10.1	7.8	13.9	14.8
	Rail solutions	15.0	21.6	7.7	-15.7	-14.8	-19.7	-2.1	51.2	6.2	1.8	-9.4	3.6
	Defense solutions	-7.2	0.2	-5.5	73.9	42.5	112.8	54.2	-56.2	18.2	18.6	48.1	25.1
	Eco plants	-23.0	-15.0	80.6	6.0	-10.6	58.8	-7.3	-9.3	8.2	5.6	11.6	12.5
OP		24	31	32	61	32	67	43	31	147	173	254	329
YoY (%)		-8.7	99.4	301.8	-97.4	35.5	113.9	35.5	-49.3	83.9	17.3	47.0	29.5
OP margin (%)		3.5	4.0	4.1	6.6	4.7	6.8	4.9	3.6	4.7	5.1	6.5	7.4
NP		14	27	33	124	19	54	34	23	198	131	190	253
YoY (%)		86.6	64.6	377.5	246.5	31.3	103.4	4.1	-81.2	197.4	-34.0	45.5	33.1
Net margin (%)		2.1	3.4	4.2	13.5	2.8	5.5	3.9	2.7	6.3	3.8	4.9	5.7

Source: Company data, Mirae Asset Securities Research

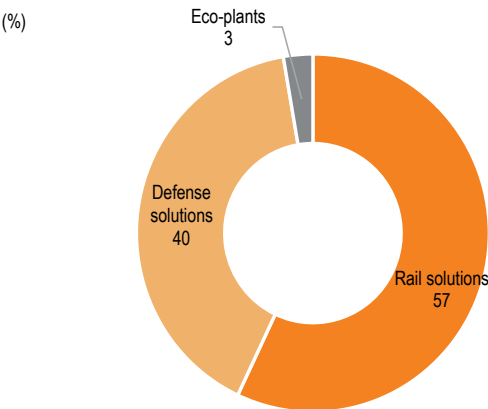
Company overview

Evolving into a global leader in battle tanks

Established in 1999, Hyundai Rotem joined the Hyundai Motor Group in 2001 and changed to its current name in 2007. The company operates three main businesses: 1) rail solutions (design and manufacturing of various types of railway vehicles); 2) defense solutions (mass production of battle tanks and wheeled armored vehicles); and 3) eco plants (steel- and auto-making facilities).

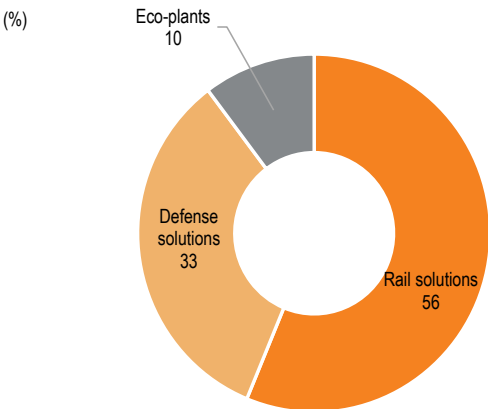
The mainstay rail solutions business is moving beyond rolling stock production and expanding into railway services, such as maintenance, refurbishment, and parts supplies. The company's current growth driver is defense solutions. Following the conclusion of a framework agreement with Poland for 1,000 K2 tanks, the company has been aggressively advancing into the global battle tank market. The K2 is now considered one of the world's three leading battle tanks alongside the US's M1 Abrams and Germany's Leopard 2.

Figure 174. Hyundai Rotem: Orders by business division (2022)



Source: Company data, Mirae Asset Securities Research

Figure 175. Hyundai Rotem: Revenue by business division (2022)



Source: Company data, Mirae Asset Securities Research

Hyundai Rotem (064350 KS)

Income statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Revenue	3,163	3,410	3,884	4,459
Cost of revenue	2,798	3,007	3,447	3,938
GP	365	403	437	521
SG&A expenses	218	230	183	192
OP (adj.)	147	173	254	329
OP	147	173	254	329
Non-operating profit	-43	-24	-4	3
Net financial income	-32	-3	-5	3
Net income from associates	0	0	0	0
Pretax profit	104	149	250	332
Income tax	-91	22	65	86
Profit from continuing operations	195	127	185	246
Profit from discontinued operations	0	0	0	0
NP	195	127	185	246
Attributable to owners	198	131	190	253
Attributable to minority interests	-3	-4	-5	-7
Total comprehensive income	223	135	185	246
Attributable to owners	227	138	187	250
Attributable to minority interests	-4	-3	-3	-4
EBITDA	186	213	300	380
FCF	684	198	257	310
EBITDA margin (%)	5.9	6.2	7.7	8.5
OP margin (%)	4.6	5.1	6.5	7.4
Net margin (%)	6.3	3.8	4.9	5.7

Balance sheet (summarized)

(Wbn)	2022	2023F	2024F	2025F
Current assets	3,319	3,488	3,887	4,309
Cash & equivalents	506	473	817	1,153
AR & other receivables	308	363	384	416
Inventory	236	288	320	369
Other current assets	2,269	2,364	2,366	2,371
Non-current assets	1,505	1,593	1,684	1,716
Investments in associates	10	9	15	19
PP&E	1,200	1,298	1,380	1,409
Intangible assets	79	78	74	69
Total assets	4,824	5,081	5,571	6,024
Current liabilities	2,573	2,820	3,003	3,121
AP & other payables	387	390	446	492
Short-term financial liabilities	703	761	747	668
Other current liabilities	1,483	1,669	1,810	1,961
Non-current liabilities	760	638	761	849
Long-term financial liabilities	453	209	244	278
Other non-current liabilities	307	429	517	571
Total liabilities	3,332	3,458	3,763	3,970
Equity attributable to owners	1,520	1,656	1,846	2,099
Capital stock	546	546	546	546
Capital surplus	520	520	520	520
Retained earnings	168	298	488	741
Minority interests	-29	-33	-38	-45
Shareholders' equity	1,491	1,623	1,808	2,054

Cash flow statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Operating cash flow	716	326	380	383
NP	195	127	185	246
Non-cash income/expenses	59	105	116	134
Depreciation	25	28	35	41
Amortization	13	12	11	10
Other	21	65	70	83
Chg. in working capital	497	125	149	86
Chg. in AR & other receivables	-49	-50	-14	-22
Chg. in inventory	167	14	-32	-49
Chg. in AP & other payables	42	85	29	31
Income tax	-3	-29	-65	-86
Cash flow from investing activities	-429	-152	-51	1
Chg. in PP&E	-31	-122	-117	-70
Chg. in intangible assets	-15	-12	-7	-5
Chg. in financial assets	-396	-24	73	76
Other	13	6	0	0
Cash flow from financing activities	-97	-205	21	-45
Chg. in financial liabilities	-84	-186	21	-45
Chg. in equity	0	0	0	0
Dividends	0	0	0	0
Other	-13	-19	0	0
Chg. in cash	186	-33	344	336
Beginning balance	320	506	473	817
Ending balance	506	473	817	1,153

Source: Company data, Mirae Asset Securities Research estimates

Key valuation metrics/ratios

	2022	2023F	2024F	2025F
P/E (x)	15.7	24.7	17.0	12.7
P/CF (x)	12.2	13.9	10.7	8.5
P/B (x)	2.0	1.9	1.7	1.5
EV/EBITDA (x)	17.8	15.3	10.0	7.1
EPS (W)	1,812	1,196	1,741	2,318
CFPS (W)	2,325	2,120	2,752	3,485
BPS (W)	13,930	15,173	16,914	19,232
DPS (W)	0	0	0	0
Dividend payout ratio (%)	0.0	0.0	0.0	0.0
Dividend yield (%)	0.0	0.0	0.0	0.0
Revenue growth (%)	10.1	7.8	13.9	14.8
EBITDA growth (%)	61.2	14.8	40.8	26.6
OP growth (%)	83.9	17.3	47.0	29.5
EPS growth (%)	197.4	-34.0	45.5	33.1
AR turnover (x)	11.8	11.5	11.7	12.8
Inventory turnover (x)	12.7	13.0	12.8	12.9
AP turnover (x)	8.6	8.7	9.5	10.0
ROA (%)	4.4	2.6	3.5	4.2
ROE (%)	14.1	8.2	10.9	12.8
ROIC (%)	12.6	7.2	8.9	11.5
Debt-to-equity ratio (%)	223.4	213.0	208.2	193.3
Current ratio (x)	129.0	123.7	129.5	138.1
Net debt-to-equity ratio (%)	16.5	4.2	-9.7	-23.1
Interest coverage ratio (x)	3.6	5.2	7.4	9.4

Mirae Asset Securities Co., Ltd.

Dong-ho Jeong dongho.jeong@miraeasset.com



272210 KS • Defense/Aerospace

Hanwha Systems

Building competitiveness in future warfare technologies

(Initiate)
Buy

Target price
W19,000

Upside
51.4%

Current price (9/19/23)
W12,550

KOSPI	2,559.21	Market cap (Wbn)	2,371	Shares outstanding (mn)	189	Foreign ownership (%)	4.9
-------	----------	------------------	-------	-------------------------	-----	-----------------------	-----

Report summary

Initiate with Buy and TP of W19,000

We initiate our coverage of Hanwha Systems with a Buy rating and target price of W19,000. In deriving our target price, we applied a P/B of 1.6x—a 20% discount to the average 2024F P/B of global C4ISR peers—to our 2024F BPS of W11,812.

Investment points

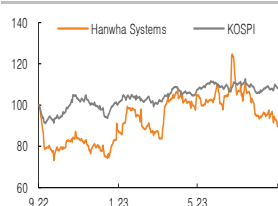
We highlight three key investment points: 1) sustained earnings growth supported by the mass production of military satellite communication (MILSATCOM) systems and tactical information communication networks (TICNs); 2) the signing of defense parts supply contracts with Poland and the UAE; and 3) new business momentum (aerospace, urban air mobility, etc.).

2Q23 review and earnings outlook

For 2Q23, Hanwha Systems delivered revenue of W610.7bn (+19.6% YoY) and operating profit of W25.9bn (+25.1% YoY; OP margin of 4.2%). Growth was robust, as mass production gained traction in the defense division and IT demand increased with the merger of ICT-related affiliates. For 2023, we look for revenue of W2.3tr (+7.5% YoY) and operating profit of W86.3bn (+260% YoY, OP margin of 3.7%).

Key data

Price performance



(%)	1M	6M	12M
Absolute	-5.2	3.1	-9.4
Relative	-7.2	-3.5	-16.6

Earnings and valuation metrics

(Dec.)	2021	2022	2023F	2024F	2025F
Revenue (Wbn)	2,090	2,188	2,353	2,508	2,678
OP (Wbn)	112	24	86	126	159
OP margin (%)	5.4	1.1	3.7	5.0	5.9
NP (Wbn)	98	-77	323	137	165
EPS (W)	630	-405	1,708	724	871
ROE (%)	6.0	-3.6	15.7	6.4	7.3
P/E (x)	25.4	-	7.3	17.3	14.4
P/B (x)	1.3	1.0	1.1	1.1	1.0
Dividend yield (%)	1.0	2.4	2.0	2.0	2.0

Notes: Under consolidated K-IFRS; NP is attributable to owners of the parent

Source: Company data, Mirae Asset Securities Research estimates

Recommendation and valuation

Initiate with Buy and TP of W19,000

We initiate our coverage of Hanwha Systems with a Buy rating and target price of W19,000. In deriving our target price, we applied a P/B of 1.6x—a 20% discount to the average 2024F P/B (1.9x) of global C4ISR peers—to our 2024F BPS of W11,812. We applied a discount to reflect: 1) Hanwha Ocean's rights issue; 2) Hanwha Systems' low margins relative to global peers.

Hanwha Systems is building a track record in high-tech segments that are likely to be key in future warfare, such as defense electronics, aerospace systems, and urban air mobility (UAM). While the Korean defense industry has been built on conventional weapons, the future of the industry lies in advanced weaponry. This bodes well for Hanwha Systems' sales volume, given the firm's domestic monopoly in radars, avionics, and combat system development (all essential elements of advanced weaponry).

In addition to the defense business, Hanwha Systems is investing in the development of satellite communications, satellite internet, and UAM technologies, which have broader civilian applications. Notably, the UAM business (in partnership with Overair) has reached the airframe assembly stage. As such progress continues, expectations for the UAM business should serve as a share price catalyst going forward.

Table 40. Hanwha Systems: TP calculation

	Value	Notes
TP (W)	19,000	
CP (W)	12,550	
Upside (%)	51.4	
Target P/B (x)	1.6	Applied 20% discount to the avg. 2024F P/B of global C4ISR peers to reflect Hanwha Ocean's rights offering and low margins relative to global peers
2024F BPS (W)	11,792	
2024F ROE (%)	6.4	

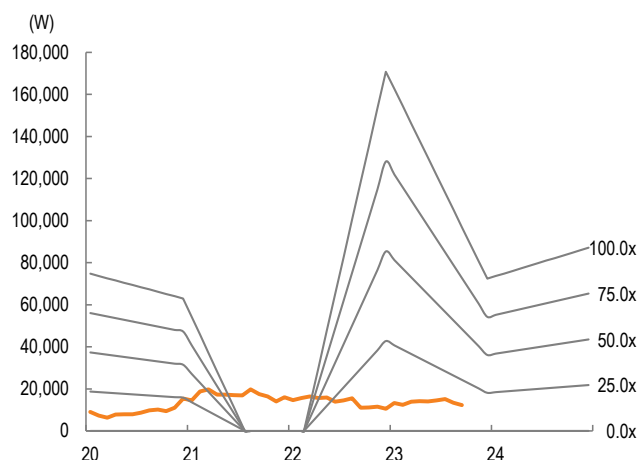
Source: Mirae Asset Securities Research

Table 41. Hanwha Systems: P/B valuation trend

	2019	2020	2021	2022	2023F	2024F	2025F
Market cap (Wbn)	1,141	1,907	3,023	1,993	2,371		
Share price (W)	10,350	17,300	16,000	10,550	12,550		
P/B (ending, x)	1.2	1.8	1.3	1.0	1.1	1.1	1.0
P/B (high, x)	1.4	1.9	1.8	1.7	1.6	1.5	1.4
P/B (low, x)	1.1	0.5	1.2	0.9	0.9	0.9	0.8
P/B (avg., x)	1.2	1.1	1.4	1.3	1.2	1.2	1.1
BPS (W)	7,847	8,374	11,945	10,769	11,316	11,792	12,416
EPS (W)	630	758	630	(405)	1,708	724	871
YoY (%)	26.9	20.3	(16.9)	TTR	TTB	(57.6)	20.4
ROE (%)	8.1	9.4	6.0	(3.6)	15.7	6.4	7.3

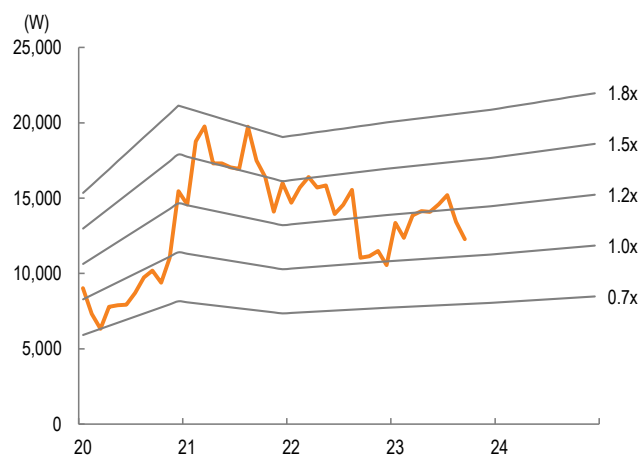
Source: Company data, Mirae Asset Securities Research

Figure 176. Hanwha Systems: 12-month forward P/E band chart



Source: QuantiWise, Mirae Asset Securities Research

Figure 177. Hanwha Systems: 12-month forward P/B band chart



Source: QuantiWise, Mirae Asset Securities Research

Table 42. Peer comparison

Company	Market cap (US\$bn)	Share performance (%)		Revenue growth (%)		OP margin (%)		P/E (x)		P/B (x)		ROE (%)		EPS CAGR (%)
		1M	YTD	24F	25F	24F	25F	24F	25F	24F	25F	24F	25F	21-25F
Korean defense														
Hanwha Aerospace	4.2	1.3	48.1	13.5	7.8	7.5	8.2	16.2	13.0	1.4	1.3	9.3	10.6	72.6
KAI	3.6	4.9	-3.2	-0.3	21.4	6.9	8.4	22.6	16.0	2.6	2.3	12.1	15.1	42.5
Hyundai Rotem	2.4	3.0	4.0	13.9	14.8	6.5	7.4	23.1	17.4	1.7	1.5	10.9	12.8	65.9
Hanwha Systems	1.8	-5.4	18.7	6.6	6.8	5.0	6.0	17.3	14.4	1.1	1.0	6.4	7.3	-18.1
LIG Nex1	1.4	14.8	-6.5	18.2	12.9	8.9	10.2	9.1	7.1	1.5	1.3	17.8	19.4	37.1
Global C4ISR														
RTX	109.4	-12.4	-25.5	8.4	7.3	12.0	12.8	13.8	11.4	1.5	1.5	11.0	12.9	26.9
BAE Systems	39.7	9.5	23.2	5.8	6.8	10.9	11.1	15.7	14.4	2.6	2.5	16.7	17.6	13.5
L3Harris	33.1	-3.5	-15.9	8.8	5.4	15.0	15.5	13.1	12.1	1.8	1.7	11.9	12.7	34.8
Elbit Systems	9.0	0.3	23.0	7.1	1.3	7.8	7.6	25.8	23.1	N/A	N/A	N/A	N/A	N/A

Source: Mirae Asset Securities Research

2Q23 review and earnings outlook

2Q23 review

For 2Q23, Hanwha Systems delivered above-consensus results, with revenue of W610.7bn (+19.6% YoY) and operating profit of W25.9bn (+57.9% YoY; OP margin of 4.2%). Growth was robust, as mass production gained traction in the defense division and IT demand increased with the merger of ICT-related affiliates.

By business, the defense division posted revenue of W448.1bn (+17.1% YoY) and operating profit of W28.2bn (-8.6% YoY; OP margin of 6.3%). Revenue recognition began in earnest for MILSATCOM (second round) and TICN (fourth round) mass production, boosting top-line growth. The ICT division recorded revenue of W162.4bn (+27.3% YoY) and operating profit of W11bn (+1,109.1% YoY; OP margin of 6.7%).

The defense division won orders for follow-ons to Ulsan-class batch III frigates (W399.2bn). Moreover, the company entered into a heads of agreement (HOA) with Leonardo for the export of a preliminary model of its AESA radar, gaining a foothold on the global radar market.

The company has also made some progress in new businesses. It obtained a government license for satellite internet service operations in Jul. 2023 and plans to focus on the B2G/B2B segment utilizing OneWeb's low Earth orbit satellite networks. The satellite business is expected to take off with the development of micro-satellites called synthetic aperture radar (SAR) systems (W67.9bn; orders won in May 2023).

Table 43. Hanwha Systems: 2Q23 review

(Wbn)

	2Q22	1Q23	2Q23			Consensus	
			Actual	QoQ (%)	YoY (%)	Est.	Diff. (%)
Revenue	511	440	611	39.0	19.6	553.3	10.4
OP	16	8	26	208.3	57.9	25.1	3.0
NP	(46)	185	75	-59.5	-261.2	13.0	475.4
OP margin (%)	3.2	1.9	4.2	2.3	1.0	4.5	-0.3
Net margin (%)	-9.1	42.1	12.2	-29.8	21.3	2.3	9.9
Revenue by business							
Defense	383	292	448.1	53.2	17.1		
ICT	128	147	162.4	10.5	27.3		
Defense as % of revenue	75.0	66.5	73.4	6.8	-1.6		

Source: Mirae Asset Securities Research

Earnings outlook

For 2023, we expect Hanwha Systems to deliver revenue of W2.35tr (+7.5% YoY) and operating profit of W86.3bn (+260% YoY; OP margin of 3.7%).

In 2H23, TICN mass production (fourth round) and the MILSATCOM-II should remain key revenue sources. Revenue from exports of K2 tank/K9 self-propelled howitzer components (Poland) and multi-function radars for the Cheongung II M-SAM system (UAE) is also expected to drive earnings. Furthermore, the second round of supply contracts with Poland and potential orders for the Cheongung II M-SAM system from Saudi Arabia should also help bolster defense earnings.

For the ICT division, we look for average-level revenue and operating profit growth in 2023. New businesses should weigh on profits until the satellite communications and UAM businesses start to generate meaningful revenue in 2026 and 2025, respectively. That said, expectations for new businesses could provide share price momentum.

Table 44. Hanwha Systems: Quarterly and annual earnings

(Wbn)

Business		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23F	4Q23F	2022	2023F	2024F	2025F
Order backlog	Total	5,917	5,839	5,650	5,987	5,954	5,807	5,705	6,591	5,987	6,591	7,026	7,468
	Defense	5,572	5,440	5,281	5,622	5,587	5,457	5,339	6,212	5,622	6,212	6,600	6,946
	ICT	345	399	369	365	367	350	365	379	365	379	426	522
Revenue	Total	430	510	459	789	440	611	495	807	2,188	2,353	2,508	2,678
	Defense	316	383	335	608	292	448	358	655	1,641	1,753	1,869	2,006
	ICT	114	128	124	181	147	162	136	153	547	598	637	669
	New business	0	1	1	0	1	1	2	0	3	4	4	5
Growth (%)	Total	17.1	5.1	-16.0	16.0	2.3	19.6	7.7	2.4	5.2	7.5	6.6	6.8
	Defense	36.6	4.2	-23.0	18.4	-7.3	17.1	6.8	7.7	6.1	6.8	6.6	7.3
	ICT	-16.0	7.7	11.3	8.8	29.0	27.3	9.5	-15.4	2.8	9.5	6.5	5.0
	New business	N/A	N/A	-53.0	N/A	851.3	-51.7	30.0	N/A	-0.1	30.0	25.0	20.0
OP		15	16	1	-8	8	26	20	32	24	86	126	159
YoY (%)		-50.7	-47.8	-98.8	204.7	-45.0	58.0	3,637.3	496.9	-78.7	260.0	45.4	27.1
OP margin (%)		3.5	3.2	0.1	-1.0	1.9	4.2	4.0	4.0	1.1	3.7	5.0	6.0
NP		12	-46	4	(46)	186	76	23	37	-77	323	137	165
YoY (%)		-56.9	-63.1	52.2	52.8	967.7	847.7	-53.9	134.3	-20.5	308.7	-58.3	24.4
Net margin (%)		2.7	-8.9	0.8	-5.9	42.4	12.5	4.6	4.6	-3.5	13.7	5.5	6.1

Source: Company data, Mirae Asset Securities Research

Company overview

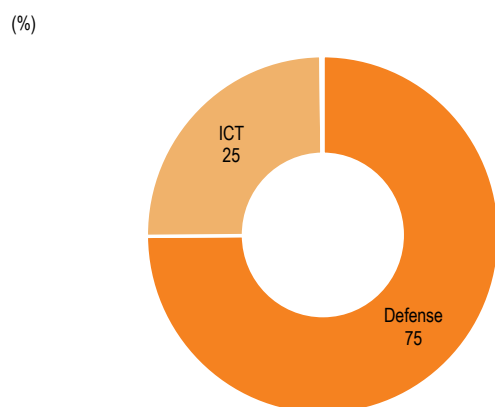
Advanced defense solutions provider

Established in 1977 as Samsung Precision, Hanwha Systems has grown to become a top-tier defense solutions provider. As the biggest developer of defense electronics (key elements of ground, naval, aerospace, and cyber weapon systems), the company plays a pivotal role in national defense. Major products include radar/electro-optics, avionics/aviation sensors, hyper-connected, multi-layer communications/command and control systems, marine/ground systems, etc.

The ICT division generates stable cash flow and profits by providing system integration (SI) and IT outsourcing services to the private sector. The company is also actively nurturing future growth businesses; for its satellite business, the firm has made investments in satellite antenna developer Kymeta and satellite internet service provider OneWeb. Moreover, it has partnered with Overair to operate the UAM business.

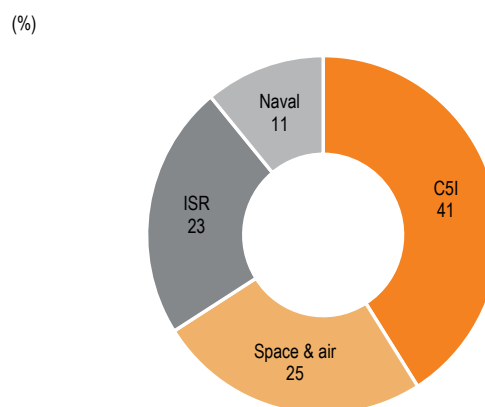
The firm's portfolio is well-balanced across: 1) the stable defense business (government-related; 75% revenue share); 2) the cash-cow ICT business (private sector-related; 33% revenue share; and 3) new businesses with the potential to drive future growth.

Figure 178. Hanwha Systems: Revenue breakdown by business (2022)



Source: Company data, Mirae Asset Securities Research

Figure 179. Hanwha Systems: Defense revenue breakdown by segment (2022)



Source: Company data, Mirae Asset Securities Research

Hanwha Systems (272210 KS)

Income statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Revenue	2,188	2,353	2,508	2,678
Cost of revenue	1,935	2,049	2,192	2,346
GP	253	304	316	332
SG&A expenses	229	218	191	173
OP (adj.)	24	86	126	159
OP	24	86	126	159
Non-operating profit	-81	324	51	54
Net financial income	19	16	10	13
Net income from associates	-27	-37	19	16
Pretax profit	-57	410	177	213
Income tax	24	91	43	51
Profit from continuing operations	-81	318	134	161
Profit from discontinued operations	0	0	0	0
NP	-81	318	134	161
Attributable to owners	-77	323	137	165
Attributable to minority interests	-4	-4	-3	-3
Total comprehensive income	-197	300	134	161
Attributable to owners	-193	304	137	165
Attributable to minority interests	-4	-4	-3	-4
EBITDA	129	192	232	279
FCF	220	201	182	259
EBITDA margin (%)	5.9	8.2	9.3	10.4
OP margin (%)	1.1	3.7	5.0	5.9
Net margin (%)	-3.5	13.7	5.5	6.2

Balance sheet (summarized)

(Wbn)	2022	2023F	2024F	2025F
Current assets	2,327	1,992	2,251	2,488
Cash & equivalents	1,228	867	994	1,191
AR & other receivables	209	214	239	246
Inventory	373	382	427	440
Other current assets	517	529	591	611
Non-current assets	1,619	2,215	2,269	2,352
Investments in associates	16	650	661	673
PP&E	274	297	315	362
Intangible assets	558	554	565	576
Total assets	3,946	4,207	4,520	4,840
Current liabilities	1,619	1,786	1,988	2,186
AP & other payables	161	165	184	190
Short-term financial liabilities	109	139	173	204
Other current liabilities	1,349	1,482	1,631	1,792
Non-current liabilities	308	302	326	334
Long-term financial liabilities	105	94	94	94
Other non-current liabilities	203	208	232	240
Total liabilities	1,927	2,088	2,314	2,519
Equity attributable to owners	2,000	2,104	2,194	2,311
Capital stock	945	945	945	945
Capital surplus	1,086	1,088	1,088	1,088
Retained earnings	117	393	483	601
Minority interests	19	15	12	9
Shareholders' equity	2,019	2,119	2,206	2,320

Cash flow statement (summarized)

(Wbn)	2022	2023F	2024F	2025F
Operating cash flow	269	286	279	396
NP	-81	318	134	161
Non-cash income/expenses	255	-93	115	137
Depreciation	77	77	78	90
Amortization	28	29	29	30
Other	150	-199	8	17
Chg. in working capital	104	74	63	136
Chg. in AR & other receivables	-29	0	-24	-7
Chg. in inventory	34	-9	-45	-13
Chg. in AP & other payables	40	-1	14	4
Income tax	-24	-35	-43	-51
Cash flow from investing activities	-679	-636	-147	-186
Chg. in PP&E	-48	-85	-97	-137
Chg. in intangible assets	-32	-27	-39	-41
Chg. in financial assets	-1	-1	-5	-2
Other	-598	-523	-6	-6
Cash flow from financing activities	-3	-26	-13	-16
Chg. in financial liabilities	54	20	33	31
Chg. in equity	1	3	0	0
Dividends	-30	-47	-47	-47
Other	-28	-2	1	0
Chg. in cash	-409	-361	127	198
Beginning balance	1,637	1,228	867	994
Ending balance	1,228	867	994	1,191

Source: Company data, Mirae Asset Securities Research estimates

Key valuation metrics/ratios

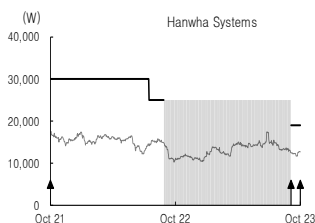
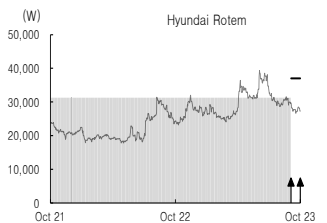
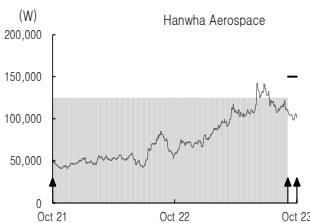
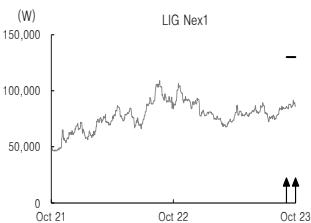
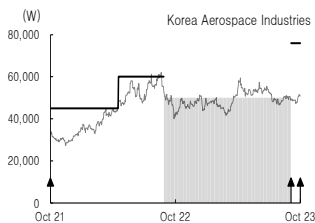
	2022	2023F	2024F	2025F
P/E (x)	-	7.3	17.3	14.4
P/CF (x)	11.4	10.5	9.5	7.9
P/B (x)	1.0	1.1	1.1	1.0
EV/EBITDA (x)	7.6	9.0	7.0	5.2
EPS (W)	-405	1,708	724	871
CFPS (W)	921	1,192	1,316	1,580
BPS (W)	10,769	11,316	11,792	12,416
DPS (W)	250	250	250	250
Dividend payout ratio (%)	-57.9	14.7	34.9	29.0
Dividend yield (%)	2.4	2.0	2.0	2.0
Revenue growth (%)	4.7	7.5	6.6	6.8
EBITDA growth (%)	-38.0	49.1	20.8	20.2
OP growth (%)	-78.6	259.5	45.3	27.1
EPS growth (%)	-	-	-57.6	20.4
AR turnover (x)	11.7	11.7	11.7	11.6
Inventory turnover (x)	5.6	6.2	6.2	6.2
AP turnover (x)	19.1	17.2	17.2	17.1
ROA (%)	-2.1	7.8	3.1	3.4
ROE (%)	-3.6	15.7	6.4	7.3
ROIC (%)	5.8	25.5	21.4	29.4
Debt-to-equity ratio (%)	95.4	98.6	104.9	108.6
Current ratio (x)	143.8	111.5	113.3	113.8
Net debt-to-equity ratio (%)	-51.3	-31.0	-34.1	-39.6
Interest coverage ratio (x)	4.1	8.3	10.4	11.6

Appendix 1

Important disclosures and disclaimers

Two-year rating and TP history

Company	Date	Rating	TP (₩)	Company	Date	Rating	TP (₩)
Korea Aerospace Industries (047810)	09/20/23	Buy	76,000	Hyundai Rotem (064350)	09/20/23	Buy	37,000
	09/14/22	No Coverage		Hanwha Systems (272210)			
	05/04/22	Buy	60,000		09/20/23	Buy	19,000
	05/28/21	Buy	45,000		09/14/22	No Coverage	
LIG Nex1 (079550)					08/01/22	Buy	25,000
	09/20/23	Buy	130,000		05/07/22	One year	30,000
Hanwha Aerospace (012450)					05/07/21	Buy	30,000
	09/20/23	Buy	150,000				
	12/08/20	No Coverage					



Stock ratings

Buy	Expected 12-month performance: +20% or greater
Trading Buy	Expected 12-month performance: +10% to +20%
Hold	Expected 12-month performance: -10% to +10%
Sell	Expected 12-month performance: -10% or worse

Sector ratings

Overweight	Expected to outperform the market over 12 months
Neutral	Expected to perform in line with the market over 12 months
Underweight	Expected to underperform the market over 12 months

Rating and TP history: Share price (—), TP (—), Not Rated (■), Buy (▲), Trading Buy (■), Hold (●), Sell (◆)

* Our investment rating is a guide to the expected return of the stock over the next 12 months.

* Outside of the official ratings of Mirae Asset Securities Co., Ltd., analysts may call trading opportunities should technical or short-term material developments arise.

* The TP was determined by the Mirae analyst through various methods discussed in this report, in part based on estimates of future earnings.

* TP achievement may be impeded by risks related to the subject securities and companies, as well as general market and economic conditions.

Ratings distribution and investment banking services

	Buy	Trading Buy	Hold	Sell
Ratings distribution	88.81%	7.24%	3.29%	0.66%
Investment banking services	95.65%	4.35%	0%	0%

* Based on recommendations in the last 12-months (as of September 30, 2023)

Disclosures

As of the publication date, Mirae Asset Securities Co., Ltd. has acted as a liquidity provider for equity-linked warrants backed by shares of Hanwha Aerospace, Korea Aerospace Industries as an underlying asset; other than this, Mirae Asset Securities has no other special interests in the covered companies.

As of the publication date, Mirae Asset Securities Co., Ltd. provides services for Hanwha Systems to ensure the fulfillment of its debt obligations directly or indirectly, including payment guarantees, endorsement of notes, collateralization, and debt assumptions.

Analyst certification

The research analysts who prepared this report (the "Analysts") are registered with the Korea Financial Investment Association and are subject to Korean securities regulations. They are neither registered as research analysts in any other jurisdiction nor subject to the laws or regulations thereof. Each Analyst responsible for the preparation of this report certifies that (i) all views expressed in this report accurately reflect the personal views of the Analyst about any

and all of the issuers and securities named in this report and (ii) no part of the compensation of the Analyst was, is, or will be directly or indirectly related to the specific recommendations or views contained in this report. Mirae Asset Securities Co., Ltd. ("Mirae Asset Securities") policy prohibits its Analysts and members of their households from owning securities of any company in the Analyst's area of coverage, and the Analysts do not serve as an officer, director, or advisory board member of the subject companies. Except as otherwise specified herein, the Analysts have not received any compensation or any other benefits from the subject companies in the past 12 months and have not been promised the same in connection with this report. Like all employees of Mirae Asset Securities, the Analysts receive compensation that is determined by overall firm profitability, which includes revenues from, among other business units, the institutional equities, investment banking, proprietary trading, and private client divisions. At the time of publication of this report, the Analysts do not know or have reason to know of any actual, material conflict of interest of the Analyst or Mirae Asset Securities except as otherwise stated herein.

Disclaimers

This report was prepared by Mirae Asset Securities, a broker-dealer registered in the Republic of Korea and a member of the Korea Exchange. Information and opinions contained herein have been compiled in good faith and from sources believed to be reliable, but such information has not been independently verified and Mirae Asset Securities makes no guarantee, representation or warranty, express or implied, as to the fairness, accuracy, completeness, or correctness of the information and opinions contained herein or of any translation into English from the Korean language. In case of an English translation of a report prepared in the Korean language, the original Korean language report may have been made available to investors in advance of this report.

The intended recipients of this report are sophisticated institutional investors who have substantial knowledge of the local business environment, its common practices, laws, and accounting principles, and no person whose receipt or use of this report would violate any laws or regulations or subject Mirae Asset Securities or any of its affiliates to registration or licensing requirements in any jurisdiction shall receive or make any use hereof.

This report is for general information purposes only and is not and shall not be construed as an offer or a solicitation of an offer to effect transactions in any securities or other financial instruments. The report does not constitute investment advice to any person, and such person shall not be treated as a client of Mirae Asset Securities by virtue of receiving this report. This report does not take into account the particular investment objectives, financial situations, or needs of individual clients. The report is not to be relied upon in substitution for the exercise of independent judgment. Information and opinions contained herein are as of the date hereof and are subject to change without notice. The price and value of the investments referred to in this report and the income from them may depreciate or appreciate, and investors may incur losses on investments. Past performance is not a guide to future performance. Future returns are not guaranteed, and a loss of original capital may occur. Mirae Asset Securities, its affiliates, and their directors, officers, employees, and agents do not accept any liability for any loss arising out of the use hereof.

Mirae Asset Securities may have issued other reports that are inconsistent with, and reach different conclusions from, the opinions presented in this report. The reports may reflect different assumptions, views, and analytical methods of the analysts who prepared them. Mirae Asset Securities may make investment decisions that are inconsistent with the opinions and views expressed in this research report. Mirae Asset Securities, its affiliates, and their directors, officers, employees, and agents may have long or short positions in any of the subject securities at any time and may make a purchase or sale, or offer to make a purchase or sale, of any such securities or other financial instruments from time to time in the open market or otherwise, in each case either as principals or agents. Mirae Asset Securities and its affiliates may have had, or may be expecting to enter into, business relationships with the subject companies to provide investment banking, market-making, or other financial services as are permitted under applicable laws and regulations.

No part of this document may be copied or reproduced in any manner or form or redistributed or published, in whole or in part, without the prior written consent of Mirae Asset Securities. For further information regarding company-specific information as it pertains to the representations and disclosures in this Appendix 1, please contact compliance@miraeasset.us.com or +1 (212) 407-1000.

Distribution

United Kingdom: This report is being distributed by Mirae Asset Securities (UK) Ltd. in the United Kingdom only to (i) investment professionals falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the "Order"), and (ii) high net worth companies and other persons to whom it may lawfully be communicated, falling within Article 49(2)(A) to (E) of the Order (all such persons together being referred to as "Relevant Persons"). This report is directed only at Relevant Persons. Any person who is not a Relevant Person should not act or rely on this report or any of its contents.

United States: Mirae Asset Securities is not a registered broker-dealer in the United States and, therefore, is not subject to U.S. rules regarding the preparation of research reports and the independence of research analysts. This report is distributed in the U.S. by Mirae Asset Securities (USA) Inc., a member of FINRA/SIPC, to "major U.S. institutional investors" in reliance on the exemption from registration provided by Rule 15a-6(b)(4) under the U.S. Securities Exchange Act of 1934, as amended. All U.S. persons that receive this document by their acceptance hereof represent and warrant that they are a major U.S. institutional investor and have not received this report under any express or implied understanding that they will direct commission income to Mirae Asset Securities or its affiliates. Any U.S. recipient of this document wishing to effect a transaction in any securities discussed herein should contact and place orders with Mirae Asset Securities (USA) Inc. Mirae Asset Securities (USA) Inc. accepts responsibility for the contents of this report in the U.S., subject to the terms hereof, to the extent that it is delivered to a U.S. person other than a major U.S. institutional investor. Under no circumstances should any recipient of this research report effect any transaction to buy or sell securities or related financial instruments through Mirae Asset Securities. The securities described in this report may not have been registered under the U.S. Securities Act of 1933, as amended, and, in such case, may not be offered or sold in the U.S. or to U.S. persons absent registration or an applicable exemption from the registration requirements.

Hong Kong: This report is distributed in Hong Kong by Mirae Asset Securities (HK) Limited, which is regulated by the Hong Kong Securities and Futures Commission. The contents of this report have not been reviewed by any regulatory authority in Hong Kong. This report is for distribution only to professional investors within the meaning of Part I of Schedule 1 to the Securities and Futures Ordinance of Hong Kong (Cap. 571, Laws of Hong Kong) and any rules made thereunder and may not be redistributed in whole or in part in Hong Kong to any person.

India: This report is being distributed by Mirae Asset Capital Markets (India) Private Limited ("MACM") in India to the customers based in India and is personal information only for those authorised recipient(s). MACM is inter alia a Securities and Exchange Board of India ("SEBI") registered Research Analyst in India and is not registered outside India. MACM and Mirae Asset, Korea are group entities. MACM makes no guarantee, representation or warranty, express or implied, as to the fairness, accuracy, completeness or correctness of the information and opinions contained herein. The user assumes the entire risk of any use made of this information. This report has been provided for assistance only and is not intended to be and must not alone be taken as the basis for an investment decision. Recipient must read the entire Appendix 1 to the report carefully for Important Disclosures & Disclaimers.

All other jurisdictions: Customers in all other countries who wish to effect a transaction in any securities referenced in this report should contact Mirae Asset Securities or its affiliates only if distribution to or use by such customer of this report would not violate applicable laws and regulations and not subject Mirae Asset Securities and its affiliates to any registration or licensing requirement within such jurisdiction.

Mirae Asset Securities International Network

Mirae Asset Securities Co., Ltd. (Seoul)

One-Asia Equity Sales Team
Mirae Asset Center 1 Building
26 Eulji-ro 5-gil, Jung-gu, Seoul 04539
Korea

Tel: 82-2-3774-2124

Mirae Asset Securities (USA) Inc.

810 Seventh Avenue, 37th Floor
New York, NY 10019
USA

Tel: 1-212-407-1000

Mirae Asset Securities (Singapore) Pte. Ltd.

6 Battery Road, #11-01
Singapore 049909
Republic of Singapore

Tel: 65-6671-9845

Mirae Asset Investment Advisory (Beijing) Co., Ltd

2401B, 24th Floor, East Tower, Twin Towers
B12 Jianguomenwai Avenue, Chaoyang District
Beijing 100022
China

Tel: 86-10-6567-9699

Ho Chi Minh Representative Office

7F, Saigon Royal Building
91 Pasteur St.
District 1, Ben Nghe Ward, Ho Chi Minh City
Vietnam

Tel: 84-8-3910-7715

Mirae Asset Securities (HK) Ltd.

Units 8501, 8507-8508, 85/F
International Commerce Centre
1 Austin Road West
Kowloon
Hong Kong

Tel: 852-2845-6332

Mirae Asset Wealth Management (Brazil) CCTVM

Rua Funchal, 418, 18th Floor, E-Tower Building
Vila Olimpia
Sao Paulo - SP
04551-060
Brazil

Tel: 55-11-2789-2100

Mirae Asset Securities (Vietnam) LLC

7F, Saigon Royal Building
91 Pasteur St.
District 1, Ben Nghe Ward, Ho Chi Minh City
Vietnam

Tel: 84-8-3911-0633 (ext.110)

Beijing Representative Office

2401A, 24th Floor, East Tower, Twin Towers
B12 Jianguomenwai Avenue, Chaoyang District
Beijing 100022
China

Tel: 86-10-6567-9699 (ext. 3300)

Mirae Asset Capital Markets (India) Pvt Ltd

1st Floor, Tower 4, Equinox Business Park,
LBS Marg, Off BKC, Kurla (West), Mumbai - 400 070
India

Tel: 91-22-62661300 / 48821300

Mirae Asset Securities (UK) Ltd.

41st Floor, Tower 42
25 Old Broad Street,
London EC2N 1HQ
United Kingdom

Tel: 44-20-7982-8000

PT. Mirae Asset Sekuritas Indonesia

District 8, Treasury Tower Building Lt. 50
Sudirman Central Business District
Jl. Jend. Sudirman, Kav. 52-54
Jakarta Selatan 12190
Indonesia

Tel: 62-21-5088-7000

Mirae Asset Securities Mongolia UTsk LLC

#406, Blue Sky Tower, Peace Avenue 17
1 Khoroo, Sukhbaatar District
Ulaanbaatar 14240
Mongolia

Tel: 976-7011-0806

Shanghai Representative Office

38T31, 38F, Shanghai World Financial Center
100 Century Avenue, Pudong New Area
Shanghai 200120
China

Tel: 86-21-5013-6392