CRANE

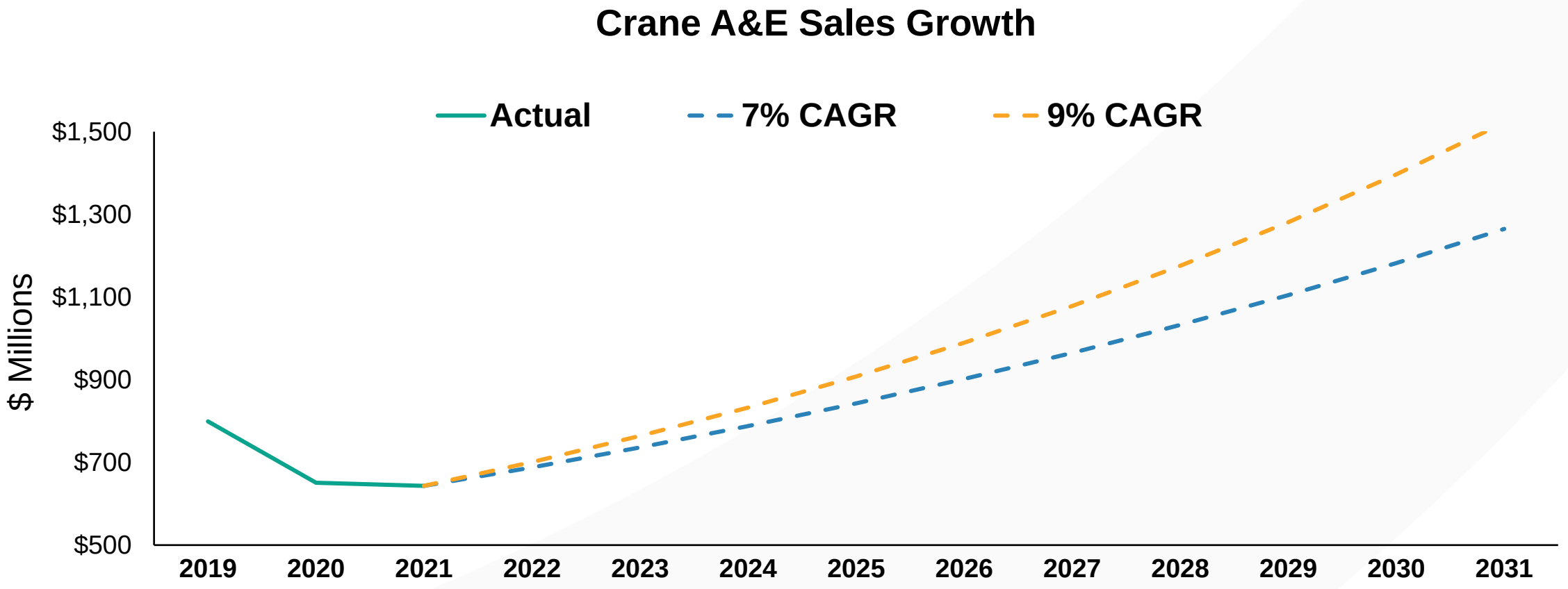
AEROSPACE & ELECTRONICS

John Higgs

President, Crane Aerospace & Electronics



HIGH VISIBILITY TO LONG TERM GROWTH



Our positions on market leading platforms, continued new program wins, and technology investment will drive a 7%-9% Long term sales CAGR

CRANE

LARGE AND GROWING END MARKETS

Long-term market fundamentals are strong



Commercial

44,000 Aircraft

New commercial deliveries 2021–2040

4.0% CAGR

Traffic growth (RPK) 2021–2040



Defense

$112 Billion

2022 DoD Research, Development, Test & Evaluation



Space

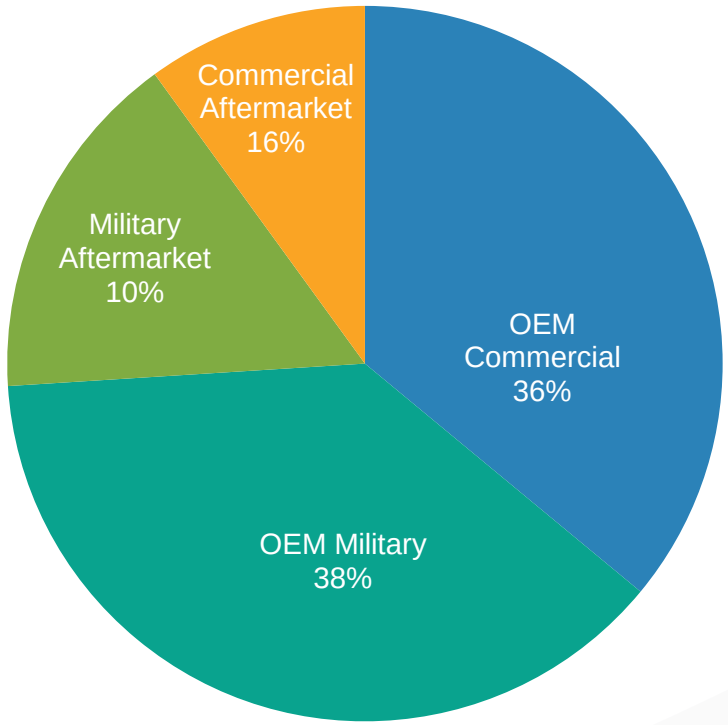
$141 Billion

Component Maintenance, Repair & Overhaul 2022

Source: Boeing Commercial Market Outlook and Department of Defense budget

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STRONG NEAR-TERM OUTLOOK



Segment Sales	2018	2019	2020	2021	2022G
Commercial	3%	5%	(37%)	2%	16%
Defense	10%	12%	17%	(7%)	(1%)
Total OEM	7%	7%	(16%)	(3%)	8%

Segment Sales	2018	2019	2020	2021	2022G
Commercial	12%	7%	(42%)	12%	15%
Defense	3%	17%	15%	(11%)	(3%)
Total Aftermarket	10%	10%	(26%)	2%	8%

Strong backlog & post-COVID market recovery driving growth in 2022

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POSITIONED TO OUTGROW UNDERLYING MARKETS

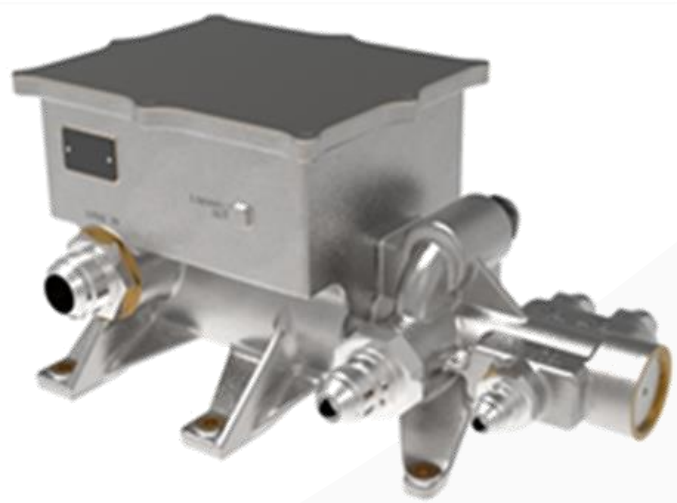


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CONTINUED INNOVATION AND R&D DRIVING GROWTH



Bi-directional power conversion to support hybrid drivetrains



High voltage DC smart pumps for coolant and fuel systems

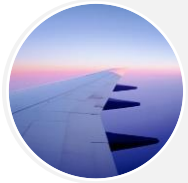


High accuracy proximity sensors to support more connected aircraft

CRANE

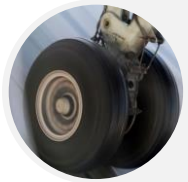
DEEP AND STRONG CORE COMPETENCIES

Core A&E Capabilities



Sensing Systems

- Condition and position sensing
- Pressure and flow measurement



Landing Systems

- System control algorithms
- Electric and hydraulic actuation

Power Solutions

- Power conversion
- EMI design and assembly



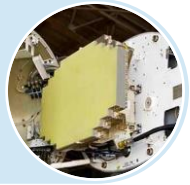
Fluid & Thermal Management

- Flow management
- Liquid cooling



Microwave Solutions

- High frequency signal processing
- RF engineering

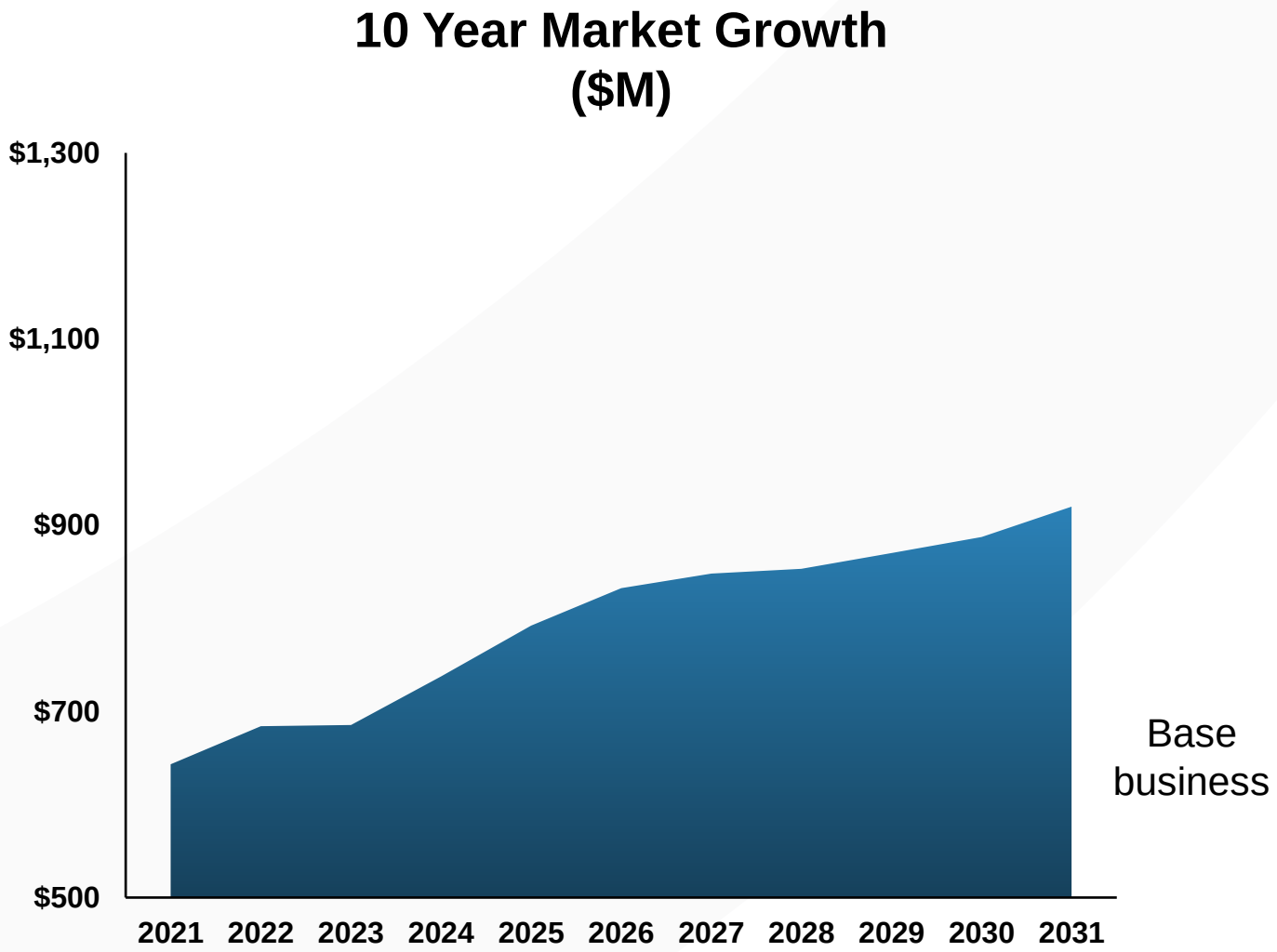


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MULTIPLE HIGH-CONFIDENCE GROWTH DRIVERS



Existing base



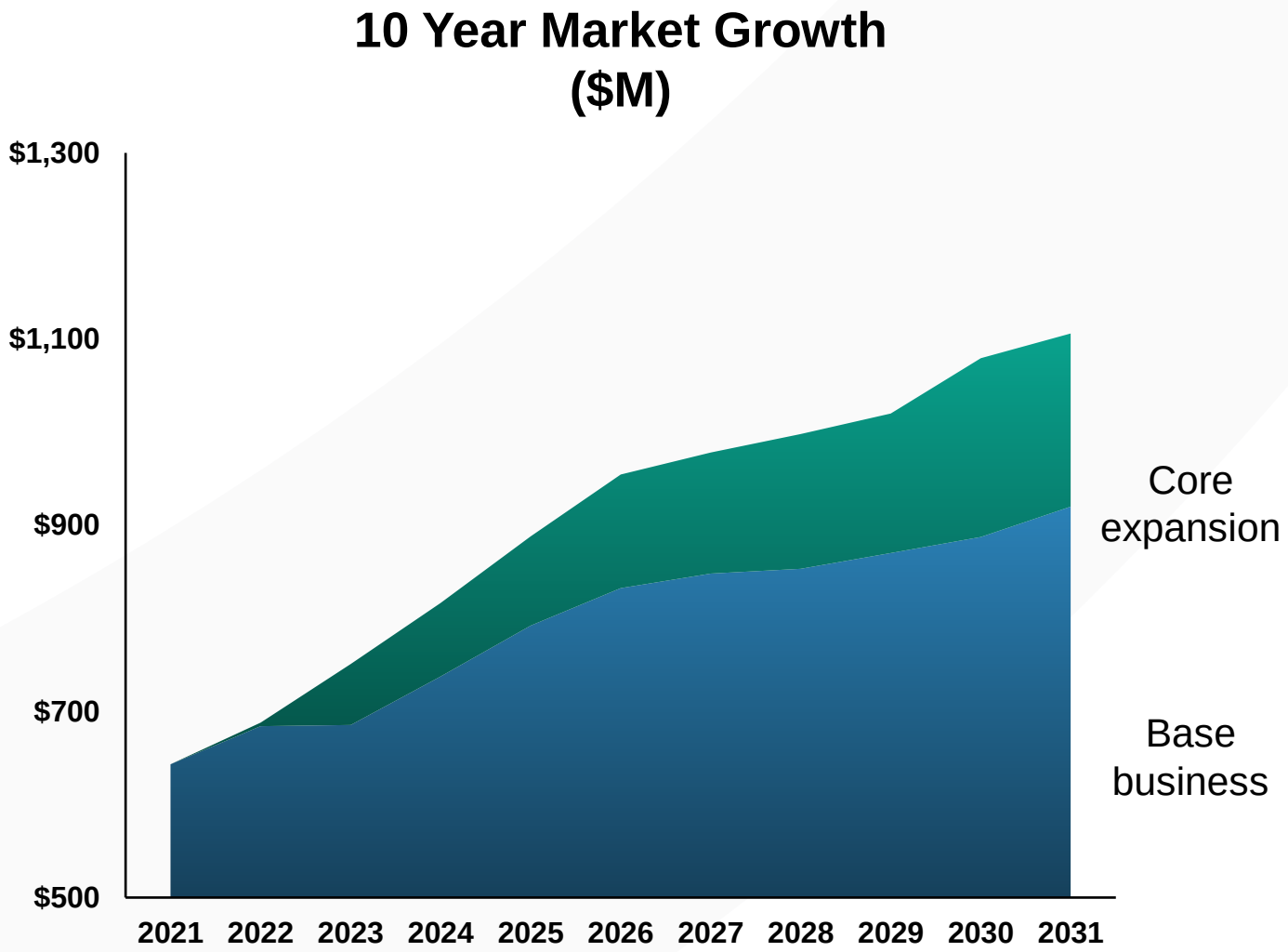
MULTIPLE HIGH-CONFIDENCE GROWTH DRIVERS



Expanding core



Existing base



MULTIPLE HIGH-CONFIDENCE GROWTH DRIVERS



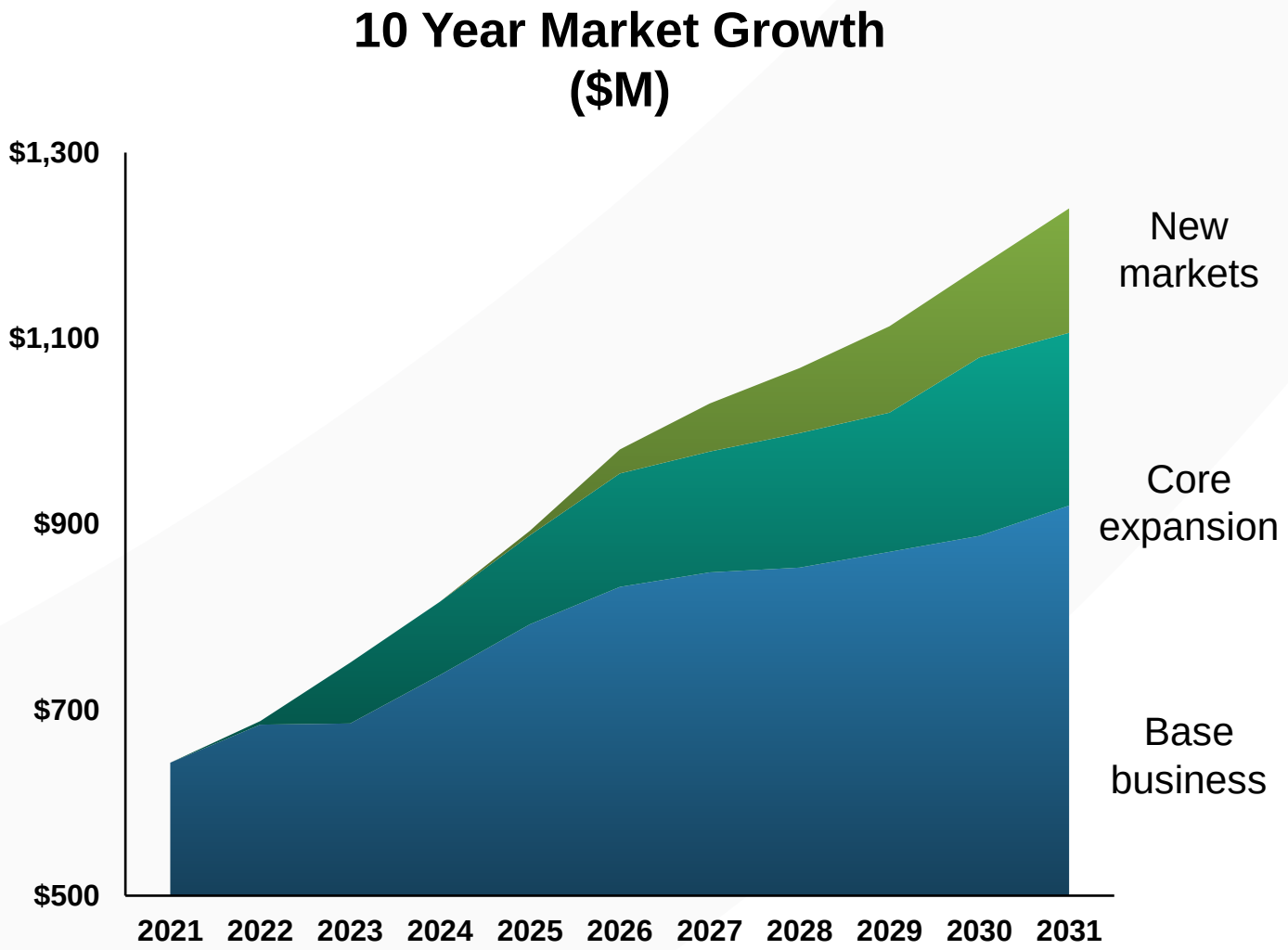
New markets



Expanding core



Existing base



BROAD-BASED COMMERCIAL AEROSPACE PRESENCE



Boeing 737 MAX



Airbus A320neo



Boeing 787



Comac C919

Strong positions on nearly all high-volume production platforms

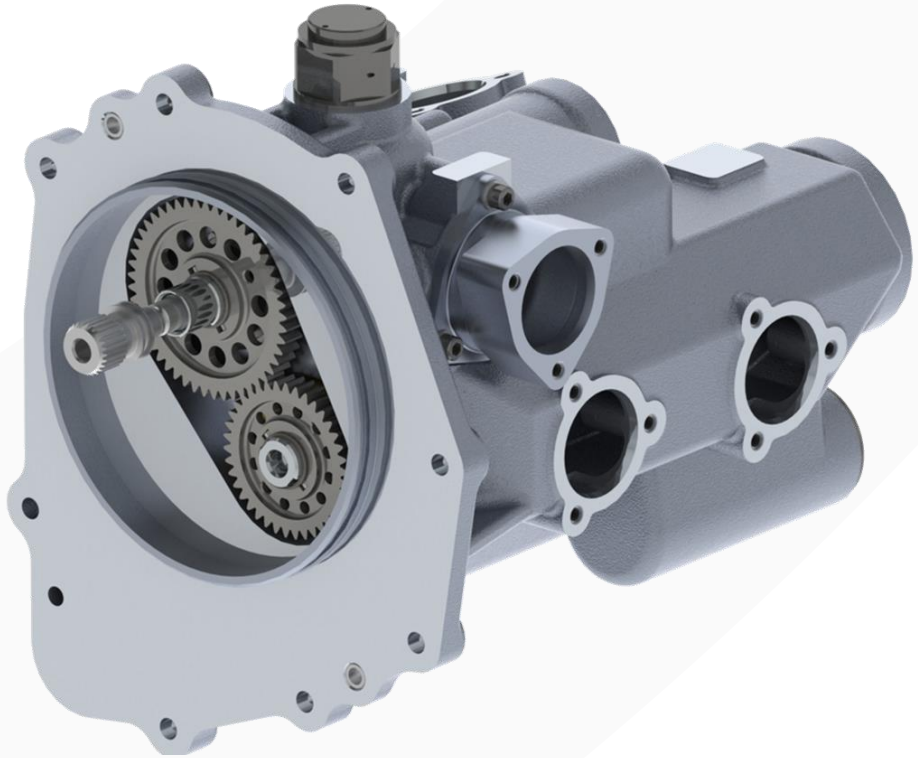
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NUMEROUS NEXT-GENERATION AIRCRAFT OPPORTUNITIES

High voltage DC “smart” pump



Next generation lube and scavenge pump



Already securing content on next-generation production platforms

CRANE

WELL-POSITIONED IN DEFENSE AND SPACE MARKETS



Lockheed Martin F-35



NASA Mars Perseverance rover



Lower Tier Air and Missile Defense Sensor (LTAMDS)



TPY-4 Radar

Strong positions on numerous high-volume production platforms

CRANE

JUST A FEW OF OUR MOST RECENT WINS…



High reliability – high accuracy pressure sensors for engine control

- Leverage Crane's silicon on sapphire pressure sensor
- Supporting multiple engine models



US Air Force upgrade of F-16 landing gear braking system

- Utilize Crane's proven anti-skid brake system design
- Upgrade existing fleet of over 1,000 aircraft



Power conversion for NASA Artemis

- Crane's proven high reliability DC/DC power converters
- Estimated launch in 2024

Continue to grow base business with new-program wins

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KEY TARGET OPPORTUNITIES FOR FURTHER SHARE GAINS



Low Earth Orbit (LEO) Satellite Networks



Urban eVTOL



Electric / Hybrid Military Vehicles



Alternative Propulsion Aircraft

Technology roadmaps aligned with major areas of expected market growth

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CONTINUING TO INVEST FOR THE FUTURE



Empowering an efficient & sustainable "Electric World"

- Pioneering advanced power conversion
- Modular motor controls suite
- Thermal management systems

CRANE

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Enabling space exploration & a more connected world

- Micro-multifunction modules for LEO constellations
- Modular hybrid power converters
- Cutting-edge integrated microwave assembly

CRANE

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Supporting automation in a "Smart Systems" world

- Long-range wireless solutions
- High-accuracy sensors

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THERMAL MANAGEMENT OPPORTUNITIES

Leverage historical success and core capabilities to enter new markets

Increasing electrical systems require liquid cooling

Addressable market growing 37%
2022 – 2031



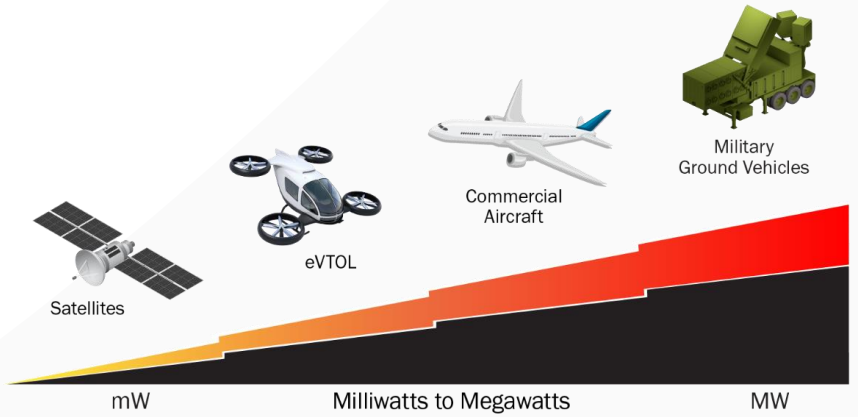
POWER CONVERSION OPPORTUNITIES

Leverage current broad-based offerings and capabilities to enter new markets

Current demand for high power electronic warfare and LEO satellite constellations

Developing high power systems for future defense ground vehicles

Created standard products for advanced air mobility & eVTOL





5 Watts
1” X 1” X ½”
~15 grams



250 KW
4’ X 4’ X 4’
~1 ton

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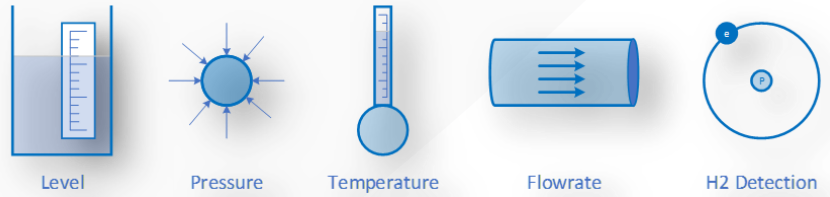
SENSING OPPORTUNITIES

Extended long-range wireless facilitates increased data usage and reduce wiring weight

Future engine applications demand increased accuracy and reliability

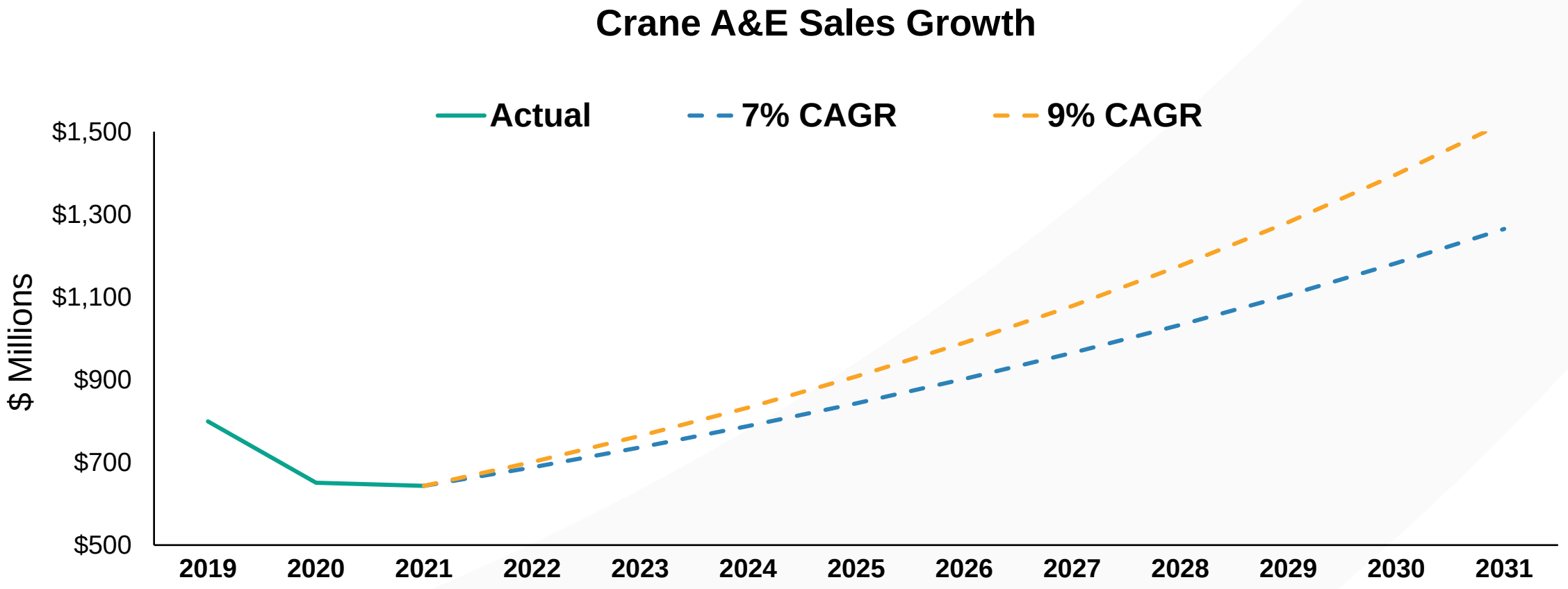
Advanced sensing to address alternative fuel developments





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HIGH VISIBILITY TO LONG TERM GROWTH



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GROWTH THROUGH ADJACENCIES

Core A&E Capabilities

- Power conversion
- EMI design and assembly
- Condition and position sensing
- Pressure and flow measurement
- Flow management
- Liquid cooling
- System control algorithms
- Electric and hydraulic actuation
- High frequency signal processing
- RF engineering

Adjacencies

Organic



Acquisition



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INVESTING IN CONTINUOUS IMPROVEMENT

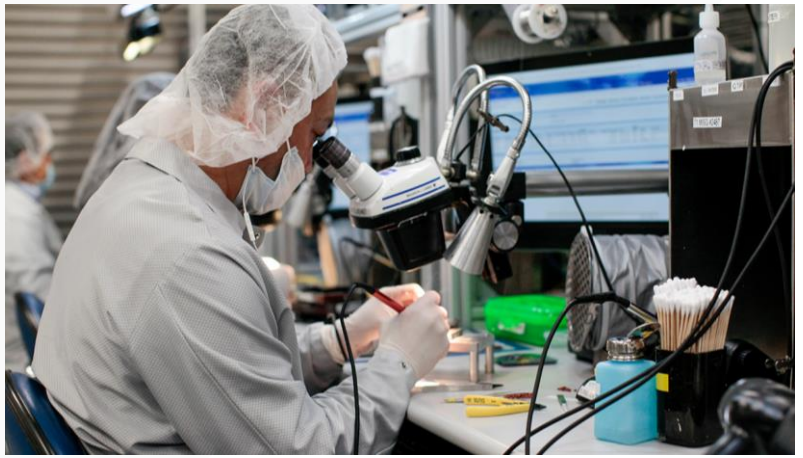
Leveraging Crane Business System to drive efficiencies

5.2% sales per head improvement in 2022

111 Kaizens in 2021 (34% annual increase)

27 new Kaizen tool champions





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WELL POSITIONED FOR PROFITABLE LONG-TERM GROWTH

- Differentiated and best-in-class technology in large, growing markets
- Extremely strong position on existing high-volume platforms
- Technology roadmap positions us well for next-generation aircraft, engines and defense systems
- Crane Business System driving both productivity and growth
- Confident in 7% to 9% sales CAGR




CRANE