



# Aerospace and Defense Solutions

Advanced and Durable Linear Motion Components for Air, Land and Sea Applications



## Linear Motion Solutions That Rise Above the Standard

Best-in-class products. Unsurpassed customization expertise. Innovative solutions to improve and revolutionize linear motion. When it comes to outfitting machines within the demanding aerospace and defense markets, nothing less will suffice. The Thomson philosophy of results-oriented business processes forms the foundation to drive advantages in quality, delivery and performance.

### A Long History of Success

The Thomson brand has been well known in the aerospace and defense industries for as long as we've been in business. In 1939, our founder, John B. Thomson Sr., invented the Ball Bushing® to reduce friction in the motion of Boeing B29 airplane propellers. Ever since, our expertise in linear motion technology has lent itself to countless high-level applications in commercial and military aircraft, ground defense and weapons systems.

From ball screw assemblies, heavy duty electric linear actuators and screw jacks to acme screws and linear guides, our breadth of solutions, as well as the processes by which they are manufactured and tested, have been able to meet even the most stringent governmental standards and design requirements.

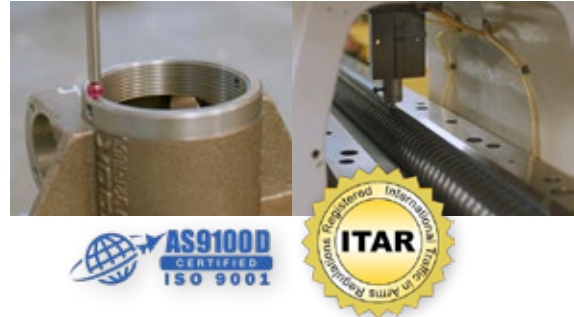


### The Thomson Advantage

When customers choose Thomson, they're getting more than just the right product for their machine. They're establishing a partnership that begins with concept/design collaboration through prototyping, purchasing and installation, and is continually supported throughout the product lifecycle. Plus, with our in-house testing, state-of-the-art measurement equipment and product validation, you can always rest assured that you're not only getting the right component the first time, but that it will live a long and productive life.

- Thomson engineers work with you to determine whether a standard or customized linear motion solution best meets your design requirements. Our custom capabilities span all product categories and include attachments, exotic materials, plating and coating, strokes and lengths, and many others.
- In-house manufacturing capabilities include thread rolling, heat treatment, CNC machining, assembly and testing just to name a few.

- Depending on your design specifications, we are able to supply a complete linear motion system.
- A rigorously controlled process integrity includes Lean Manufacturing, 5S, and Six Sigma. Our quality systems emphasize continuous improvement, defect prevention, statistical methods, and ongoing training to increase the knowledge and skills of all employees.
- Thomson test systems and engineered testing processes perform analysis, verification, and solidification of life, durability, and performance.
- Rest easy knowing that Thomson has achieved AS9100, ISO 14001:2015 and ISO 9001:2015 certifications, and is ITAR compliant.
- We take great pride in our track record of success as a supplier to prime defense contractors within the U.S. Armed Forces, and that the large majority of our components are produced and distributed in the U.S.



### Key Applications by Air, Land and Sea

For many decades, Thomson has worked closely with customers across the globe to determine the ideal linear motion solutions for a wide variety of demanding applications. Our commitment and dedication to helping design engineers meet their precise requirements has been the driver behind countless, long-standing partnerships within industries such as:

- |                        |                      |                      |
|------------------------|----------------------|----------------------|
| • Aerospace            | • Electronics        | • Packaging          |
| • Military and Defense | • Semiconductor      | • Factory Automation |
| • Maintenance Stands   | • Tire Manufacturing | • Chemical           |
| • Paper                | • Medical            | • Steel              |
| • Transportation       | • Automotive         |                      |





## Product Overview

From standard ball screws to multi-component, custom assemblies, Thomson and Nook solutions run the gamut of proven linear motion technology. Our wide selection of high-quality products provides machine designers with unparalleled flexibility and reliability that helps maintain their trust in our brand.

### Ball Screws

Our precision ball screws have a proven track record in the aerospace and defense industries, withstanding the rigorous use that is demanded in a variety of harsh environments. Available in metric or inch sizes (4 – 160 mm / 0.375 – 4 in) with the option of being machined and assembled with nuts, flanges or wipers, these ball screws are constructed of high-strength tubular steel, and are lightweight and compact.

- The unique thread form, an engineered Gothic arch, maintains tighter contact angle control than other thread forms.
- Patented scraper/wiper systems offer exceptional performance with low torque, high lubricant retention and excellent sand/dust/fluid ingress resistance.
- Three types of ball return systems allow users to optimize noise, vibration, mounting and cost for their designs.



### Electric Linear Actuators

Our linear actuators have set the industry standard in quality for more than 60 years, delivering only the best in control, durability, load capacity and eco-friendliness. Capable of handling loads up to 40,000 lbs, these products have been tested for use in some of the harshest conditions, achieving up to a IP69K (static) rating.

- Select actuators are integrated with onboard controls, which enable enhanced control functions that previously required complex external controls. They feature enhanced controllability and allow you to monitor performance and provide diagnostics to help increase efficiency and productivity.
- Electric actuators are inherently clean since there are no messy compressors, filters, oils or other mediums involved. In fact, most are clean enough to be used in areas sensitive to contamination right out of the box.



## Screw Jacks

Ruggedly designed and produced with load handling capacities from 1/4 to 100 tons, Thomson and Nook screw jacks can be employed individually or easily configured into a multitude of custom arrangements. Ideally suited to perform in harsh environments (wet/dusty/dirty), these corrosion-resistant models can be used in chemically adverse environments.

- There are no “standard” travel lengths; each worm gear screw jack is built to specification.
- Our screw jacks run at a higher efficiency compared to competitor models, allowing for lower torque values and energy demands, and the utilization of smaller motors and drives.
- Premium finishes are available, including epoxy, outdoor, marine or per customer specification.



## Linear Guides

Available in round and square (profile), Thomson linear guides are manufactured to the highest quality standards to provide outstanding surface finish, roundness, straightness, case hardness and cylindricity.

- Conditioned for corrosive environments, round rail shafting is available in many materials with optional radial holes drilled and tapped. Supports, end blocks and assemblies can provide a complete solution.
- A wide assortment of square rail and carriages allow for easy retrofitting into existing applications or designing into new ones.



## Additional Linear Motion Products

If any of the previously mentioned product categories do not meet your application’s specific needs, there are plenty of other Thomson and Nook components that can fit the bill.

- **Lead and acme screws** are precision rolled, ensuring accurate positioning to 0.003 in/ft., and pre-loaded with nut assemblies to eliminate backlash.
- **Roller screws** offer high efficiency and reliability, can carry large loads, and produce high rotational speeds with faster acceleration without adverse effects.
- **Linear motion systems** can be configured to work in harsh environments, at high speeds and in high-precision applications. The RediMount™ motor mounting adapter kit comes standard on all systems.
- **Lifting columns**, featuring a self-supporting column and aesthetic design that requires no additional shrouding or covering, offer an all-in-one solution that is ideal for automation applications.



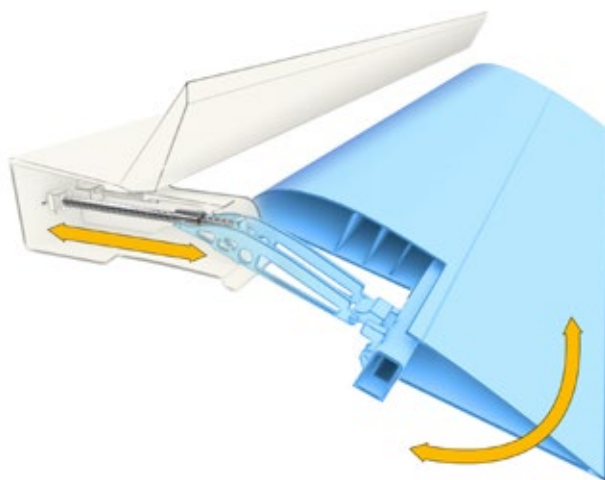
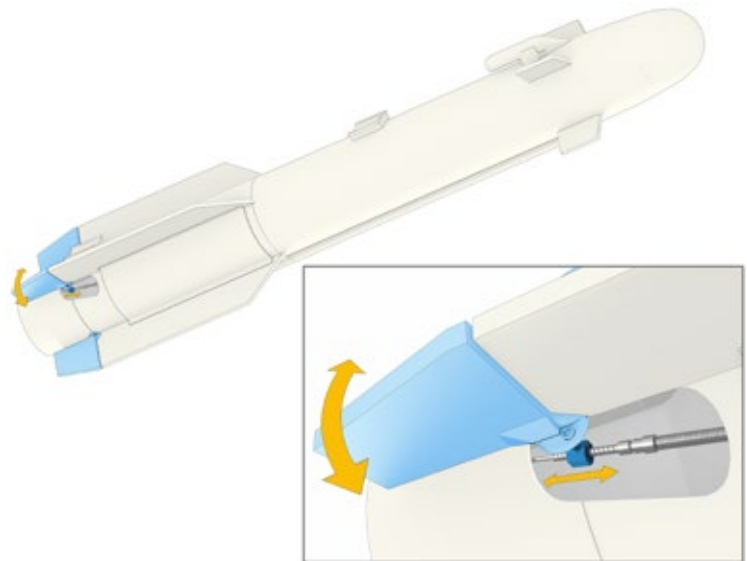
## Key Applications

Thomson and Nook linear motion solutions have been put to the test and succeeded in some of the most demanding aerospace and defense applications and environments – by air, land and sea. Over the next few pages, a closer look is provided of how various Thomson components deliver linear motion to key applications.

### AIR

#### Missile Fins

Precision miniature ball screws are used in the control actuation system of a wide array of defense programs. These applications require high-performance components that can endure extreme environmental demands. In this example, ball screws control the fins that guide the missiles or rockets for an accurate flight and on-target strike.

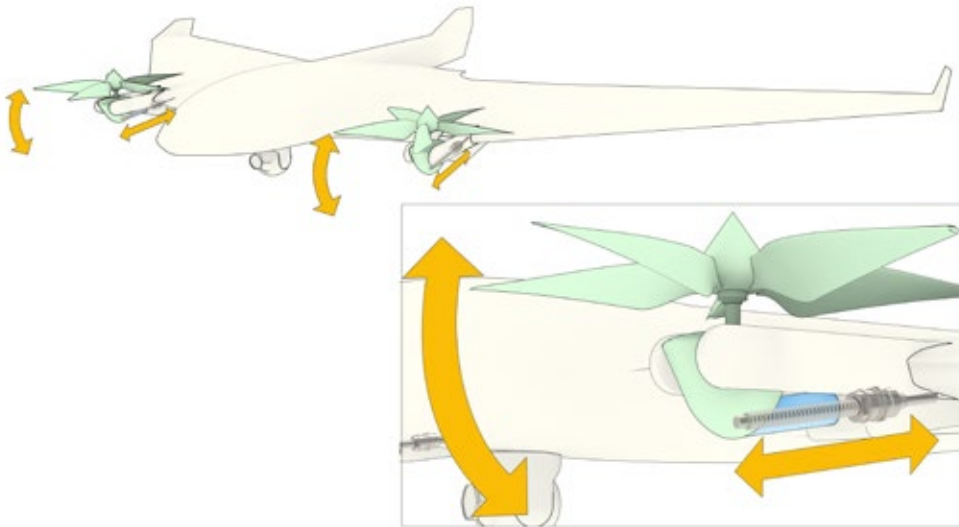
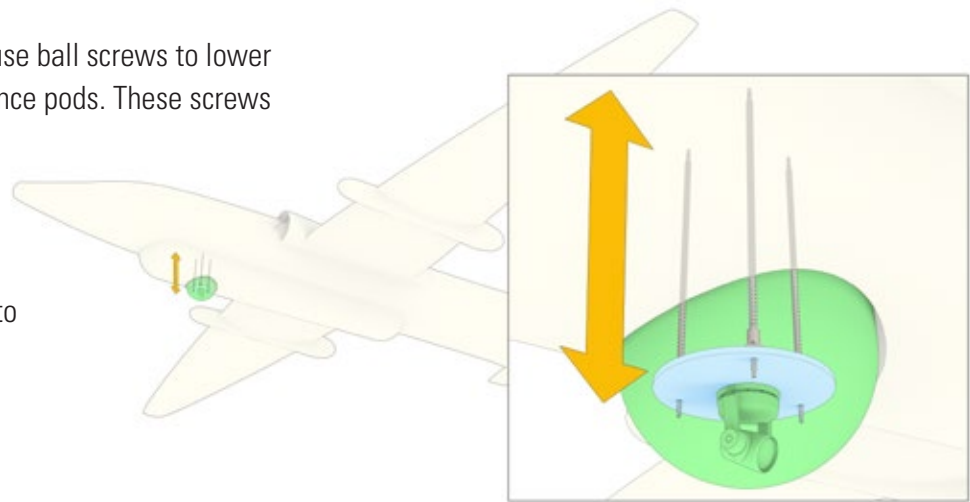


#### Air Wing Flap

The familiar sound we hear during air travel is the reliable operation of ball screws driving flight-critical systems such as flaps, stabilizers, landing gear, hatches and fly-by-wire systems. Consistent quality control, engineering expertise and product excellence are critical for these applications.

### Surveillance Targeting

Recon planes and drones use ball screws to lower and orientate the surveillance pods. These screws must withstand harsh flight environments while accurately and repeatably positioning sensitive equipment used to help today's warfighter.

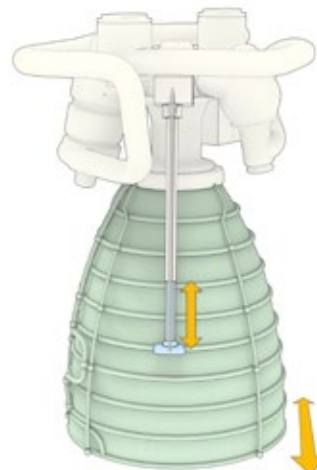


### Drone Rotor Tilt

Evolving drone technology and military needs require drones to have a smaller takeoff and landing capability. Vertical lift drones use ball screws to tilt the rotors from a launch or landing position to the forward inflight position.

### Thrust Vector Control

Harnessing the power of rocket motors, ball screws are used in actuators that position the rocket nozzles for accurate flight. From space exploration to evolving hypersonic technology, ball screws adjust and direct the rocket thrust position and vehicle trajectory.



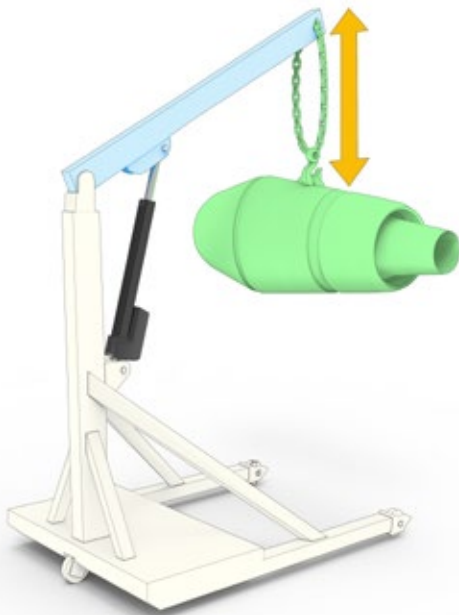


## Key Applications

### LAND

#### Vehicle Door Opener and Lock

For armored military vehicles that require error-free, powered operation for one or more doors, Thomson Electrak® electric linear actuators provide a clean, maintenance-free solution that are rated to withstand extreme temperatures and heavy ingress.



#### Ground Support

Electric linear actuators are used to assist in manufacturing across the commercial aerospace, military and defense industries. This jack stand is using an actuator to elevate the arm and eliminate the need for hydraulics.

#### Leveling Legs/Elevation Positioner

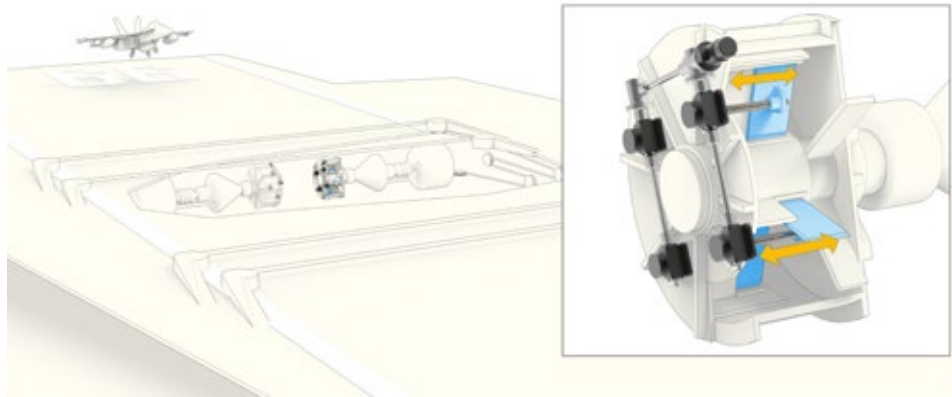
Mobile radar and launching platforms use an array of products in stabilization and payload deployment to be mission ready. Acme screws are used to level and anchor the platform to the ground, while ball screw actuators lift the payload into position for use.



## SEA

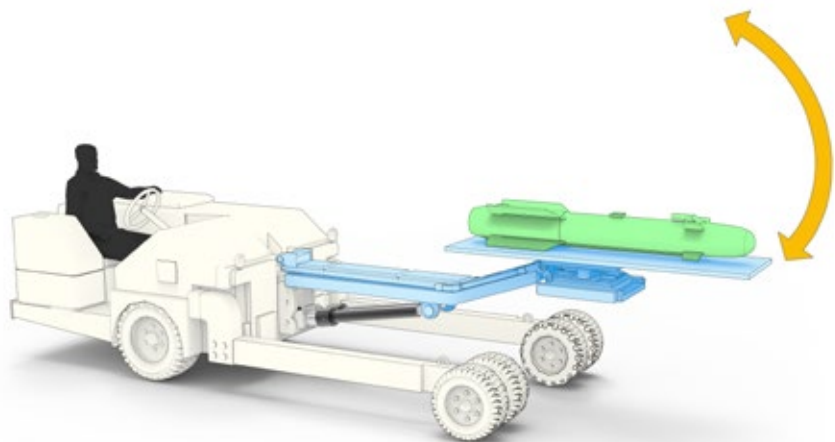
### Aircraft Arrestor System

Reducing the need for multiple arresting system setups, ball screw jacks help reduce the system's footprint on board carriers and are used to adjust fluid turbines. The turbine force adjustment can allow a larger variety of incoming aircraft to land safely.



### Munitions Handling

From staging areas to on board vehicles, weapon systems must be transported safely and with extreme care. Electric cylinders are used in the elevation and positioning of the munition handling equipment for loading and unloading.



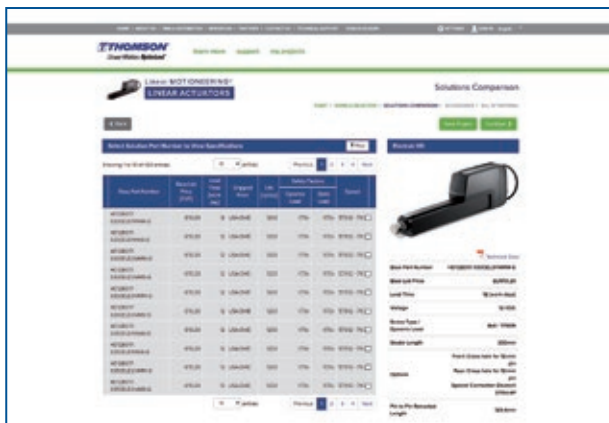


# Online Resources

Thomson offers a wide variety of online tools to help you in the linear motion component selection process. An experienced team of application engineers is also available to help size and select products to best fit your needs. To explore additional technical resources and options, contact Thomson customer support at [www.thomsonlinear.com/contact](http://www.thomsonlinear.com/contact).

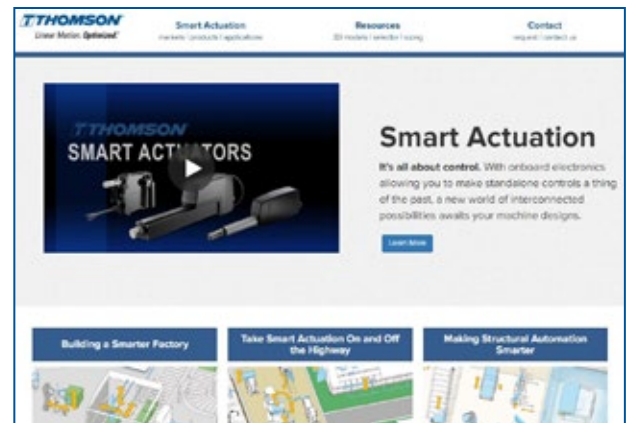
## Sizing and Selection Tools

Complete a self-guided, interactive series of questions to quickly and accurately find your ideal solution.



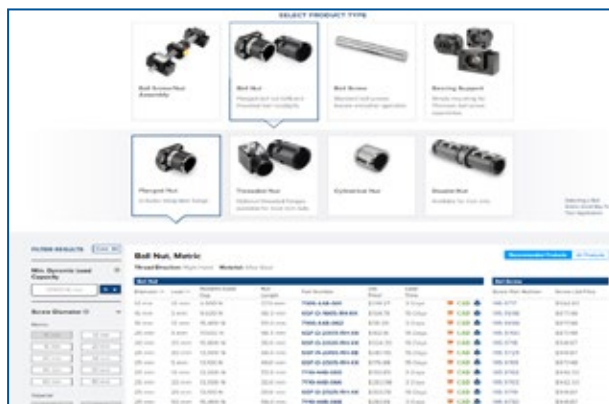
## Special-Purpose Websites

The fastest way to get all the relevant information on the latest technological advances, products and applications.



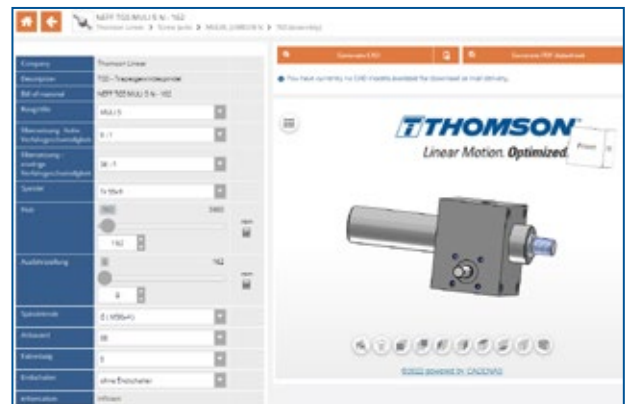
## Selector Tools

Using a simplified, application parameter-based selection process, quickly narrow your product search, access 3D models, upfront pricing and lead times, and purchase instantly.



## Interactive 3D CAD Models

Download free interactive 3D models in the most common CAD formats to assist in your design projects.



## A Closer Look at Thomson and Nook

With more than 130 years of combined linear motion pioneering under its belts, Thomson and Nook have laid the foundation for countless design successes in the aerospace and defense industries. Within this space, these brands are nationally recognized and trusted as leading producers of high-quality motion control technology, on-time delivery, controlled costs and reduced risk. Below are a couple of advantages we bring to the table of which you may not be aware.

### Fine-Tune Your Application With a Custom Solution

When a standard Thomson or Nook catalog product doesn't quite meet your exact specifications or requirements, our trusted and experienced application engineers are ready to assist you. Whether it's a simple modification or a white sheet design for a fully customized part, we are dedicated to turning around your solution in the most timely and cost-effective way possible to help you meet your deadlines and budget. Just as we do with standard products, we stand 100% behind the quality and performance of our custom products and have full confidence in their meeting your application's needs.

### A History of Innovation and Excellence

Over the past several decades, Thomson has made a series of acquisitions and mergers, and has become a global leader in linear motion. Throughout this journey, Thomson has evolved its culture by combining the best of what each company offered and has always maintained a drive for continuous improvement. In 2021, linear motion leader Nook Industries, Inc. was integrated within the Thomson business, followed a couple of years later by an acquisition by Regal Rexnord Corporation. With these recent events, Thomson and Nook have become even more equipped to provide complete system solutions through its control, drive, motor, power transmission and precision linear motion technologies.

Below is just a glimpse at some of the key Thomson innovations, milestones and accomplishments throughout its storied history.

**1939**

Thomson Saginaw produces **first aircraft ball screw** for the B-29 Super Fortress



**1945**

Thomson invents **world's first anti-friction Linear Ball Bushing® Bearing**



**1955**

Thomson develops **thread rolling process for ball screws**

**1974**

**First line of actuators** with parallel motors and both acme and ball screw drives is released

**1995**

**Lightweight titanium screw** developed for space flight

**2016**

**Electrak HD** electric linear actuator released



**2021**

**Nook Industries** integrated into the Thomson business, fortifying its breadth of offering to the aerospace and defense industry

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or visiting [www.thomsonlinear.com/contact](http://www.thomsonlinear.com/contact)



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Aerospace\_and\_Defense\_CPEN-0007-02 | 20260220KB | MCB-12417-TL-EN-US 02/26  
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