LUCINTEL INSIGHT
OCTOBER 2021

FIVE TRENDS SHAPING THE FUTURE OF THE AEROSPACE TESTING MARKET

The development of advanced technologies in aircraft testing, such as digital radiography testing, 3D scanning, and infrared thermography, are providing significant opportunities for the detection of defects and the safety of commercial/regional aircraft, helicopters, and military aircraft. Some of the key trends in the aerospace testing market are 3D scanning in aircraft inspection, digital radiography testing, infrared thermography for aerospace applications, development of

fluorescing composites material that inspects itself, and laser testing. The major growth drivers for this market are increasing aircraft deliveries, adoption of new materials in aircraft, and stringent aviation regulations and certification standards for aircraft safety.

The aerospace testing market is divided into the segments non-destructive testing and destructive testing. Key players in the aerospace testing market include Airbus, Boeing, NTS, SGS, Mistras, Intertek, Exova, MTS, Cincinnati Sub-Zero, and Dayton T. Brown. These have been working on different strategies to drive sales using highly influential marketing approaches; however, as we examine the challenges and opportunities ahead in this market, companies can benefit from a strategy of developing ultrasonic testing and digital radiography testing, as well as considering the key target market trends we have identified. Lucintel predicts the global aerospace testing market will be valued at $5.3 billion by 2025, with an expected CAGR of approx. 0.7% between 2020 and 2025.

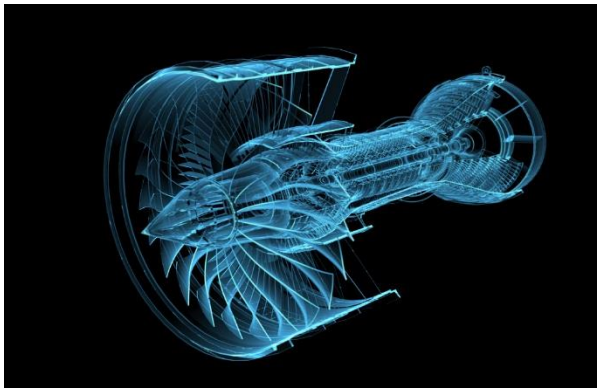
Lucintel identifies five trends set to influence the global aerospace testing market. Most of the industry players and experts agree that these five trends will accelerate developments in the aerospace testing industry in the near future. In terms of the widespread knowledge about the aerospace testing market already on the horizon, there is still a lack of unified perspective on the direction the industry is moving to proactively address developments. To help bring more clarity to this gap, our study aims to provide insights concerning the direction that changes are taking and how these changes will impact the aerospace testing market.

1. 3D Scanning in Aircraft Inspection

3D scanning is key to completing ultra-precise aircraft inspections to ensure aircraft safety. 3D laser scanning is much faster and more flexible in capturing full 3D data. Utilizing the most advanced metrology laser scanning equipment, a scan of an

entire exterior or interior of an aircraft can be completed. From the empennage, to the nose, every bit of an aircraft can be scanned, mapped, 3D imaged, and delivered in a 3D solid model. Completing a 3D scan of the interior and exterior of the plane pinpoints any structural deterioration, including accidental damage, environmental deterioration, and fatigue damage. Aircraft component and part manufacturers must obtain a Parts Manufacturer Approval (PMA), a design and production approval issued by the Federal Aviation Administration (FAA). Standards of conformity to OEM design are so strict that 3D laser scanning is essential to ensure that PMA parts will meet FAA standards for airworthiness.

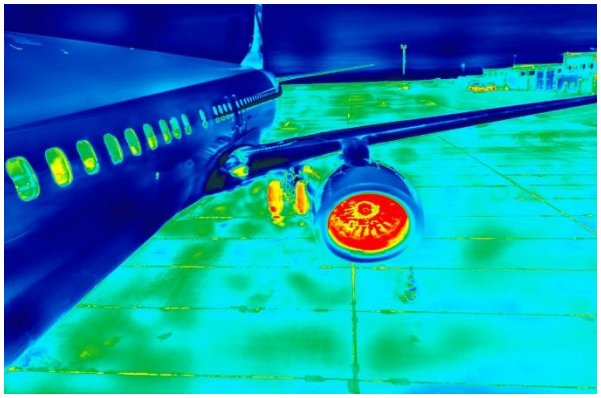
2. Digital Radiography



Digital radiography is becoming more widely used for detecting defects, cracks, corrosion, erosion, and loss of wall thickness. Digital radiography is an advanced technology based on digital detector systems in which an x-ray image is displayed directly on a computer screen without the need for developing chemicals or intermediate scanning. The method is similar to conventional radiography, but images are not captured on film. Instead, images are captured using either flat panel detectors or phosphor-coated imaging plates. Digital radiography has several important benefits, as images can be enhanced and magnified for viewing and interpretation of findings. Images can be emailed so that work can continue across times zones or sent to off-site experts for simultaneous evaluation. In addition, digital images can be archived electronically so they are easier to store, trace and view. Because there are no radiographic films to store, digital radiography can also save on the physical storage space that would normally be required for conventional film.

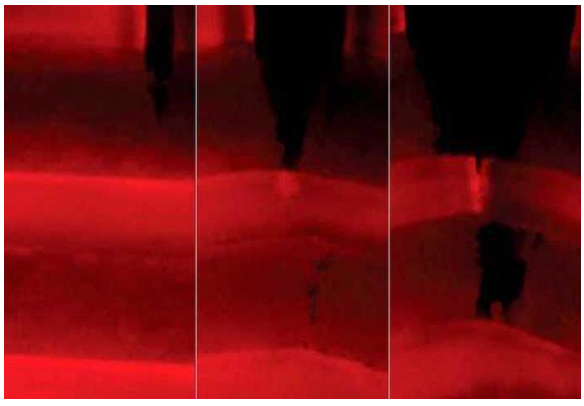
3. Infrared Thermography for Aerospace Applications

Infrared thermography (IRT) is a rapid and accurate non-destructive evaluation (NDE) technique that is widely used for the inspection of large aerospace components such as aircraft primary and secondary structures, aero-engine parts, and spacecraft components and subsystems. Typical damage scenarios in aerospace components include corrosion cracking, fatigue cracks, barely visible impact damage (BVID), delaminations, disbonding, matrix/fiber cracking, voids, and core crushing. These types of material defects may occur at any stage of a component's life cycle, from manufacturing to in-service and maintenance operations. IRT has proven to be an effective tool to detect and, in many cases, quantify these material flaws. IRT is applied to different materials including aluminum, composites, and hybrid fiber metal laminates, such glass laminate aluminum reinforced epoxy (GLARE) and carbon reinforced aluminum laminate (CARALL).



4. Development of Fluorescing Composites Material that Inspects Itself

Researchers have developed a lightweight composites material, suitable for use in aerospace applications, that changes color as soon as it is deformed. It is, effectively, a material that inspects itself. In the event an internal crack in the material forms and propagates, this material begins to fluoresce at the first sign of damage. Researchers from the Complex Materials Group have created this lightweight material from



plastic polymer and artificial nacre or mother-of-pearl. The material changes color to indicate internal deformation and thus indicates possible material failure at an early stage.

5. Laser Testing

Laser testing is a non-destructive procedure that can be split into three different techniques,: holographic testing, laser profilometry, and laser shearography. In holographic testing, a laser is used to identify variations in the exterior of a material after heat, vibration, or pressure has been applied. Outcomes are then assessed against an unstressed control sample to reveal any flaws that may be present.

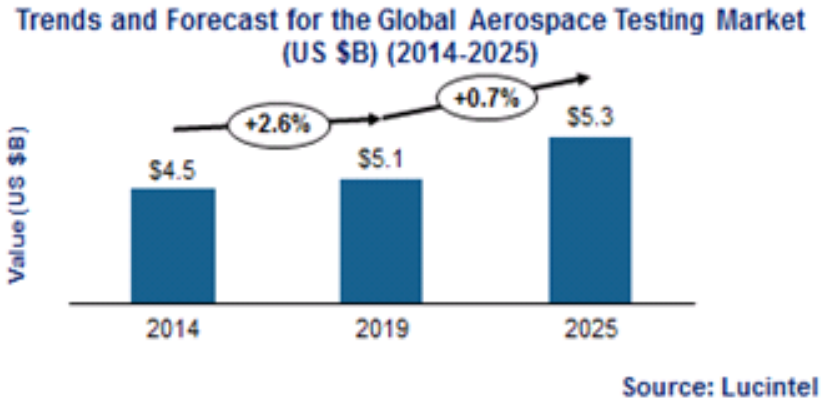
Laser profilometry is performed with a high-speed rotating laser equipped with miniscule optics. It is used to recognize cracks, corrosion, significant wear, and other flaws. Laser profilometry detects modifications in a surface by generating a 3D image.

In laser shearography, laser light is used to produce images both before and after a surface is stressed. The resulting images are compared to recognize any flaws or deterioration.

Strategic Considerations for Key Players in the Aerospace Testing Market

The aerospace testing industry is dynamic and ever-changing. Successful industry players are necessarily masters of innovation, change and adaptation. To retain this status, they need to be attentive to current trends. We believe there will be promising opportunities for aerospace testing in the commercial/regional aircraft, business jet, helicopter, and military aircraft markets. As per Lucintel's latest market research report (Source: https://www.lucintel.com/aerospace-testing-market.aspx), the aerospace testing market is expected to grow with a CAGR of approx. 0.7%

between 2020 and 2025, and reach $5.3 billion by 2025. This market is primarily driven by increasing aircraft deliveries, adoption of new materials in aircraft, and stringent aviation regulations and certification standards for the aircraft safety.



Whether you are new to the aerospace testing market or an experienced player, it is important to understand the trends that impact the development process, as these trends as listed above will lead players to create long-term strategy formulation that will allow them to remain competitive and successful in the long run. For example, to capture growth, some of the strategic considerations for players in the aerospace testing market are as follows:

- Aerospace testing market players can increase their capabilities to develop infrared thermography for the inspection of large aerospace components such as aircraft primary and secondary structures.
- Players can focus on digital radiography non-destructive testing, which is expected to lead future trends.
- Investment to increase competencies in 3D scanning for ultra-precise aircraft inspection that ensures aircraft safety
- Research and development activities to identify potential component failure and reduce maintenance cost

Note: In order to gain better understanding, and learn more about the scope, benefits, and companies researched, as well as other details in the aerospace testing market report from Lucintel, click on https://www.lucintel.com/aerospace-testing-market.aspx. This comprehensive report provides you with in-depth analysis on market trends and forecast, segment analysis, regional analysis, competitive benchmarking and company profiling of key players. In addition, we also offer **strategic growth consulting** to meet your customized needs. We have worked with many PE firms and corporate customers in the process of their market entry and M & A initiatives.

Lucintel - At a Glance

- **Premier management consulting and market research firm. Founded in 1998.**
- **Deep global insights into major industries. Team of over 120 analysts / consultants across globe**
- **Management comprised of PhDs, MBAs, and subject matter experts. Head quarter in Dallas, USA.**

Conducted 500+ consulting projects across industries for 3M, Audi, Dupont, Carlyle, GE, etc.

Consulting Services

Why Lucintel

Trusted insights: Reliable insights. Widely cited in Wall Street Journal, Financial Times, Forbes, etc.

Clients we serve: Over 1000 clients from 70 countries – Fortune 500 companies

Strategic advice: Over 20 years of proven global strategic management consulting experience

Industries Served

Contact Us

Sanjay Mazumdar, Ph.D.
CEO, Author, & Strategist
Email: sanjay.mazumdar@Lucintel.com
Tel.: 972-636-5056

Eric Dahl
Senior Executive Advisor
Email: eric.dahl@lucintel.com
Tel.: +1-323-388-6971

Brandon Fitzgerald
Director of Client Engagement
Email: brandon.fitzgerald@lucintel.com
Tel.: +1-303-775-0751

Tushita Roy
Senior Manager-Client Engagement
Email: tushita.roy@lucintel.com
Tel.: +31-6-82270883