Research and Innovation Framework

Atlântica – Instituto Universitário

1. Introduction and Institutional Mission

Atlântica recognises research, innovation and knowledge transfer as fundamental pillars of its academic mission. Research is not treated as an isolated activity, but as an integral component of teaching, professional training and service to society. Scientific knowledge generated within the institution is expected to inform education, stimulate innovation and contribute directly to economic, technological and social development.

The following sections establish the governance principles, organisational structures and operational practices that regulate research activities at Atlântica. They provide a coherent framework for scientific excellence, responsible conduct, effective project management and collaboration with external stakeholders, while offering formal assurance of the University's scientific, ethical, administrative and financial capacity to participate in national and international research programmes, including those of the European Commission.

2. Research and Innovation Strategy

Atlântica promotes an applied, interdisciplinary and impact-oriented research model aligned with European Research Area priorities and objectives in sustainability, digital transformation, health and green energy. Research activities combine fundamental investigation with technological development and real-world application, ensuring that knowledge produces measurable benefits for society and industry.

Strategic objectives include:

- increasing the quality and international visibility of scientific output;
- strengthening participation in European and national competitive funding programmes;
- consolidating partnerships with industry, municipalities and civil society;
- integrating students into active research environments;
- translating research results into innovation, services and entrepreneurial initiatives.

Within Engineering and Technology, Atlântica benefits from close collaboration with C-MAST through its institutional pole. This partnership provides advanced experimental facilities and specialised expertise in materials, structures, fluid mechanics, energy systems and sustainable technologies, reinforcing the institution's capacity to conduct high-level applied research and technology transfer.

3. Strategic Research Priorities and Scientific Capacity

Atlântica pursues a focused and forward-looking research strategy that concentrates resources in domains where the institution demonstrates critical mass, specialised infrastructure and recognised scientific competence. The objective is to ensure that research investment generates international visibility, technological relevance and measurable societal impact, while supporting long-term institutional sustainability.

For the period 2025–2029, priority development areas include:

- structural integrity, reliability and aeronautical systems engineering;

- aeronautical vibro-acoustics and structural dynamics, including vibration and noise analysis, pilot exposure assessment, and structural material behaviour;
- advanced materials characterisation, lightweight design and smart sensing technologies;
- sustainable manufacturing, joining and processing technologies, including circular recycling strategies;
- experimental and computational fluid mechanics, including wind tunnel experimentation, thermal-fluid optimisation, and additive manufacturing for aerodynamic testing and rapid prototyping;
- digital twins, multiphysics modelling and simulation of complex engineering systems, AI-assisted optimisation methods, and structural optimisation of UAVs using genetic and evolutionary algorithms;
- energy transition, thermal systems optimisation, sustainability engineering, and technology intelligence for next-generation low-carbon propulsion systems, including patent-based forecasting of aeronautical propulsion trends;
- standards development, certification support and technology qualification for industrial adoption;
- technological forecasting, patent analytics and AI-assisted future scenario construction to support strategic decision-making, research prioritisation and long-term technology planning, including applications to emerging global and anthropogenic risks;
- health, well-being, organisational performance and socio-economic innovation.

These priority areas reflect a balance between advanced engineering research, digital and sustainability-driven innovation, and societal and organisational challenges, ensuring alignment with European research agendas and stakeholder needs.

Research activities are organised within interdisciplinary centres and specialised laboratories covering engineering, digital technologies, health sciences, and social and business sciences, supported by appropriate experimental and computational infrastructures.

Through its institutional pole of **C-MAST**, Atlântica reinforces its scientific capacity by integrating advanced infrastructures, specialised expertise and collaborative research environments that support high-level applied research, doctoral training, postdoctoral development and international cooperation.

Research structures are designed to:

- aggregate senior researchers, early-career researchers and doctoral candidates;
- coordinate competitive national and international research projects;
- manage shared infrastructures and laboratories;
- sustain long-term collaboration with academic, industrial and public partners;
- ensure continuous benchmarking against international scientific and technological standards.

This integrated approach ensures that Atlântica's research priorities are matched by the institutional capacity required to deliver scientific excellence, innovation and measurable societal impact.

4. Research Governance, Lifecycle and Project Management

Atlântica applies structured governance mechanisms across the full research lifecycle to ensure quality, compliance, accountability and readiness for external evaluation and audit.

All research projects follow a common lifecycle framework encompassing:

- internal scientific and institutional validation prior to submission;
- budgetary, eligibility and ethical pre-screening;
- formal institutional approval.

During implementation, projects are conducted under the responsibility of a designated **Principal Investigator** and follow an approved work plan with defined milestones, deliverables and reporting obligations. Scientific progress and financial execution are monitored through dedicated cost centres and periodic technical and financial reporting.

At project completion, procedures ensure verification of deliverables, reconciliation of accounts, dissemination or protection of results, secure archiving of data and assessment of impact.

Atlântica participates actively in national and international research programmes, including **Erasmus+, Horizon Europe and recovery and innovation initiatives**, supported by institutional services that provide assistance in consortium building, administrative and financial management, regulatory compliance, dissemination and exploitation planning, and stakeholder engagement.

To ensure consistency and transparency, Atlântica applies **standard operating procedures** governing the full research lifecycle. These procedures define responsibilities, coordination mechanisms and control processes, supporting:

- monitoring of work plans and deliverables;
- risk management and corrective actions;
- compliance with funder requirements;
- verification and documentation of outputs.

Dedicated administrative and financial services support researchers throughout all stages, ensuring traceability, appropriate use of resources and institutional readiness for review or audit.

5. Ethics, Integrity, Data Management and Responsible AI

Atlântica upholds the highest standards of ethical conduct and research integrity and operates a zero-tolerance policy regarding misconduct.

The institution maintains:

- a Code of Ethics and Conduct;
- an independent Ethics Committee;
- procedures for ethical review and approval;
- plagiarism prevention and authorship guidelines;
- GDPR-compliant data protection measures;
- mechanisms for reporting and addressing misconduct.

Research involving human participants, personal data or sensitive issues requires prior approval. These safeguards ensure that research is conducted responsibly and in accordance with recognised European standards.

Atlântica is committed to responsible research data management and to the principles of Open Science. Research data are handled securely, ethically and transparently throughout their lifecycle.

Projects implement sound practices that include:

- Data Management Plans where required;
- secure storage and controlled access to sensitive information;
- compliance with GDPR and data protection rules;
- preservation and archiving of records;

- application of FAIR principles;
- open access publication of results and, where appropriate, datasets.

Institutional guidance supports researchers in meeting funder requirements and promotes transparency, reproducibility and long-term accessibility of research outputs.

Atlântica recognises Artificial Intelligence (AI) as a transformative and enabling technology that increasingly supports research, education and innovation across scientific, technological and organisational domains. AI-based tools, including data analytics, machine learning and generative systems, are progressively integrated into research workflows to enhance analysis, modelling, simulation, design, decision-support and knowledge transfer, contributing to improved quality, efficiency and societal impact.

The institution adopts a human-centred approach in which AI complements, but does not replace, critical thinking, scientific judgement and professional responsibility. Researchers, students and staff remain fully accountable for all methods, decisions and outputs produced with AI support. AI is therefore understood as an assistive instrument that augments expertise rather than substitutes for intellectual contribution.

Consistent with Atlântica's principles of research integrity, transparency and ethical conduct, the use of AI follows the same standards that govern all research activities. Practices ensure appropriate human oversight, critical validation of results, protection of personal and sensitive data, and compliance with applicable legal, regulatory and intellectual property requirements, including European data protection and responsible innovation frameworks.

Through training, guidance and institutional oversight, Atlântica promotes AI literacy and responsible use across its academic community. This approach enables students to develop relevant digital competencies, supports researchers in advancing scientific excellence, and ensures that all activities take place within a reliable, secure and professionally governed environment.

By integrating AI thoughtfully and responsibly, Atlântica fosters a forward-looking research ecosystem that combines technological advancement with human expertise, safeguarding trust, quality and academic excellence.

6. Knowledge Transfer, Innovation and Intellectual Property

Atlântica adopts an open-innovation approach, encouraging continuous interaction between academia, industry, public authorities and society. Research results are expected to generate practical value beyond academic publication.

Knowledge transfer is supported through:

- collaborative R&D projects with companies and public organisations;
- contract research and consultancy;
- laboratory testing and validation services;
- prototyping and demonstration activities;
- licensing and exploitation of results.

This approach enhances the relevance of research, increases technology readiness levels and contributes to regional competitiveness and sustainable development.

Innovation and entrepreneurship are promoted across all areas of education and research. Atlântica fosters a culture in which students and researchers are encouraged to transform ideas into solutions, services and new ventures.

The institution supports this objective through:

- entrepreneurship-oriented curricular units;
- project-based learning with industry challenges;
- mentoring and networking initiatives;
- innovation competitions and extracurricular programmes;
- support for start-up and spin-off development.

By integrating innovation into academic pathways, Atlântica enhances employability and supports the creation of social and economic value.

In addition, Atlântica integrates Social and Corporate Responsibility into its research governance through dedicated institutional structures and community engagement mechanisms. Activities include inclusion initiatives, sustainability practices, volunteering programmes and partnerships with municipalities, schools and civil society organisations.

This approach aligns research with the principles of Responsible Research and Innovation (RRI), ensuring that scientific activities generate measurable societal value and contribute to sustainable regional development.

Atlântica recognises intellectual property as a strategic outcome of research and promotes the responsible protection and exploitation of results for societal and economic benefit. Research outputs are managed to balance academic dissemination with the safeguarding of innovation potential.

Ownership and access rights follow institutional regulations, contractual agreements and applicable legislation, ensuring fair recognition of contributors while protecting partner interests.

Valorisation activities may include:

- intellectual property protection where appropriate;
- licensing and collaborative development;
- contract research and consultancy;
- prototyping, testing and demonstration;
- support for start-ups and spin-offs.

These mechanisms enable research results to translate into practical applications and strengthen collaboration with industry and the community.

7. Human Capital, Researcher Development and Student Engagement

Students are regarded as active participants in the research ecosystem. Engagement in research is embedded throughout academic programmes to enhance learning outcomes and professional readiness.

Opportunities include:

- integration into research teams and funded projects;
- theses aligned with real research challenges;
- co-authored publications and conference participation;
- internships with industry and community partners;
- scholarships and mobility schemes.

This model strengthens analytical skills, fosters innovation and prepares graduates for research and professional careers.

Atlântica is committed to attracting, developing and retaining talented researchers through structured and merit-based support mechanisms.

These include:

- incentives for high-quality scientific publications;
- funding for conferences and international mobility;
- seed funding for early-career initiatives;
- doctoral and postdoctoral opportunities;
- mentoring and career progression pathways.

These measures promote productivity, internationalisation and the long-term sustainability of research activities.

8. Infrastructure, Quality Assurance and Institutional Readiness

Atlântica provides modern laboratories and technical resources enabling experimental, applied and collaborative research. Facilities support materials testing, structural analysis, fluid mechanics, energy systems optimisation and digital modelling.

Through collaboration with C-MAST, researchers benefit from access to advanced scientific infrastructures, specialised expertise and experimental capabilities that strengthen research quality, validation and industrial relevance. These resources also support collaboration with external partners, reinforcing Atlântica's role within the regional and national innovation ecosystem.

Research performance is monitored through regular evaluation of publications, funding success, doctoral training outcomes, partnerships and knowledge transfer activities. Corrective measures are implemented where necessary to ensure continuous improvement.

Through the governance structures, procedures and controls described, Atlântica demonstrates:

- scientific competence;
- operational reliability;
- ethical integrity;
- financial accountability;
- adequate infrastructure and experienced management.

These elements ensure that the institution provides a secure, professionally managed and trustworthy environment for students, researchers, partners and funding authorities, and demonstrate full readiness to participate in and manage competitive European Commission research programmes.