2nd General Assembly of the EASN Association

combined with the

1st EASN Association Workshop on Aerostructures

DRAFT AGENDA

DAY 1 (7-10-2010)

09:00 – 10:00	**Registrations for the Workshop – Enrolment of EASN Association members**	
10:00 – 10:30	**Welcome and introduction** *Welcome address, Prof. Jean-Michel Most, Hosting Regional Contact Point* *Short addresses by EC and EADS representatives* *Introduction to the GA, Prof. Spiros Pantelakis, EASN chairman*	
10:30 – 12:00	**2nd General Assembly of the EASN Association** Presentation of EASN achievements over the last 3 years. Approval by the GA. Appointment of returning board - Proposal of candidates for the EASN Association BoD	
12:00 – 13:00	**Lunch break**	
13:00	**Beginning of vote casting for EASN BoD**	
13:00 – 14:00	**Parallel Session A1** Overview presentation of the INFUCOMP FP7 project Individual presentations (1, 2) *Session chair: Prof. Robert Mines*	**Parallel Session A2** Presentations from the VISION FP7 project *Session chair: Prof. Zdobyslaw Goraj*
14:00 – 14:30	**Coffee break**	
14:30 – 15:50	**Parallel Session A3** Individual presentations (3, 4, 5, 6) *Session chair: Dr. Dimitris Mavrikios*	**Parallel Session A4** Individual presentations (7, 8, 9, 10) *Session chair: Dr. Alicia Kim*
15:30	**End of vote casting for EASN BoD**	
15:50	**Announcement of voting results**	
16:00 – 16:30	**Assembly of the Elected EASN BoD**	
16:30	**End of DAY 1**	

INFUCOMP Project Overview Presentation

Simulation based solutions for industrial manufacture of large infusion composite parts
Anthony Pickett, Tony Green

VISION Project Presentations

Interface Technologies for Advanced Virtual Aircraft Products – The VISION project
L. Rentzos, G. Pintzos, K. Alexopoulos, D. Mavrikios, G. Chryssolouris

Advancing the Interactive Context of Immersive Engineering Applications
L. Rentzos, G. Pintzos, K. Alexopoulos, D. Mavrikios, G. Chryssolouris

Virtual Reality in the aerospace industry: dedicated solutions and research fields at EADS Innovation Works
M. Sturzel, F. Guillaume

Individual Presentations

(1) Design concepts for laminated composite materials with thermal and/or mechanical coupling response
C. B. York

(2) Study of an actuated bistable composite laminates for shape change applications
Christopher R. Bowen, David N. Betts, Peter F. Giddings, Y.T. Tina Fong, Aki. I.T. Salo and H. Alicia Kim

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(3) Fatigue Properties of a Gamma Titanium Aluminide Alloy
S. Beretta, M. Filippini, L. Patriarca, G. Pasquero, S. Sabbadini

(4) Crack propagation in buckling plates
Julia Bierbaum, Peter Horst

(5) Mechanical behaviour of friction stir overlap welds for aeronautical applications
Sergio Tavares, Michael Papadopoulos, Marco Pacchione

(6) The role of existing corrosion on fatigue crack initiation in 2xxx and 6xxx aluminum alloy laser beam welds
A. T. Kermanidis, A. D. Zervaki, G. N. Haidemenopoulos, Sp. G. Pantelakis

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(7) Modelling and testing of hail impact on aircraft composite laminates
Robin Olsson, Rickard Juntikka and Leif E. Asp

(8) Numerical simulation and validation of the progressive collapse of micro lattice structures in the context of foreign object impact of aerospace sandwich panels
R A W Mines, S Tsopanos, S McKown

(9) Fracture toughness and shear behavior of composite bonded joints: the effect of thermal treatment, ageing and adhesive thickness
Ch.V. Katsiropoulos, A.N. Chamos, K.I. Tserpes and G. Labeas

(10) Aeroelastic analysis of remotely controlled research vehicles with numerous control surfaces"
Z.Goraj, W.Chajec

DAY 2 (8-10-2010)

09:00 – 10:00	**Registrations for the Workshop – Enrolment of EASN Association members**	
10:00 – 11:00	**Parallel Session B1** Presentation from MAAXIMUS IP and presentations fro the AISHA II FP7 projects *Session chair: Prof. Vitalis Pavelco* *Prof. Zafer Gurdal*	**Parallel Session B2** Presentations from the SICOM FP6 project *Session chair: Mr Romain Lefrancois*
11:00 – 11:15	**Coffee Break**	
11:15 – 12:15	**Parallel Session B3** Presentations from the AISHA II FP7 project *Session chair:Cresta* *Prof. Zafer Gurdal*	**Parallel Session B4** Presentations from the ADVITAC FP7 project *Session chair: Prof. Jozsef Rohacks*
12:15 – 13:15	**Parallel Session B5** Presentations from the COALESCE 2 FP7 project *Session chair: Mr Donato Zangani* *Mr. Stefan Nystrom*	**Parallel Session B6** Presentations from the SADE FP7 project *Session chair:Amyriants* *Dr. Hans monner*
13:15 – 14:00	**Lunch break**	
14:00 – 15:00	**Parallel Session B7** Overview presentation of FANTOM and Presentations from the FLY-BAG FP7 project *Session chair: Mr Donato Zangani* *Mr. Stefan Nystrom*	**Parallel Session B8** Presentations from the SADE FP7 project *Session chair:Amyriants* *Dr. Hans monner*
15:00 – 15:15	**Coffee Break**	
15:15 – 16:15	**Parallel Session B9** Presentation from the FLY-BAG FP7 project and individual presentations (11) *Session chair: Prof. Alessandro Pirondi* *Prof. George Labeas*	**Parallel Session B10** Presentations from the SADE FP7 project and Individual presentation (12) *Session chair: Prof. Mario Guagliano* *Prof. Horst Baier*
16:15 – 17:15	**Parallel Session B11** Individual presentations (13,14,15) *Prof. Alessandro Pirondi* *Prof. George Labeas*	**Parallel Session B12** Individual presentations (16,17,18) *Session chair: Prof. Mario Guagliano* *Prof. Horst Baier*
17:15	**End of Workshop**	

MAAXIMUS IP Presentation

A multi-level nonlinear domain decomposition solver for the analysis of large aerostructures with local nonlinearities
P. Cresta

SICOM Project Presentations

Project Overview and Presentation of Decision Support Tool for Evaluation of Corrosion Control Solutions in Aircraft Structures
T. Hack, R. Adey

Corrosion behaviour of aircraft assemblies: modelling and experimental approaches
R. Oltra, A. Zimmer , O. Rogliano , J. Deconinck, S. Van damme and R. Akid

Examining the Potential of Local Cladding for Corrosion Protection of 2024-T351 Aircraft Aluminum Alloy
A. Chamos, Sp. Pantelakis, D. Setsika and V. Spiliadis

COALESCE2 Project Presentations

Overview of the COALESCE project
Stefan Nyström

Integrated Leading Edge Nose Structure
Michael Wielandt

Design and Manufacturing Aspects of Access Panels
Stéphane Debaisieux

ADVITAC Project Presentations

Project Overview and demonstration structure
R. Lefrancois, F. Arakaki, M. Hammer

Automated manufacture of 3-D reinforced aerospace structures
G. Dell'Anno, I. K. Partridge, D. D. R. Cartie, A. Hamlyn, C. Groenendijk, E. Chehura, S. W. James, R. P. Tatam, R. Lefrancois

Multifunctional composite aerostructures
R. Seddon, E. Logakis, A. A. Skordos

FANTOM Project Presentation

Project overview: electronic speckle pattern interferometry at thermal infrared wavelengths : a new technique for combining temperature and displacement measurements
M. Georges, C.Thizy, J-F. Vandenrijt, I. Alexeenko, G. Pedrini, W. Osten, I. Jorge Aldave, I. Lopez, I. Saez de Ocariz, B. Vollheim, G. Dammass, M. Krausz

SADE Project Presentations

Background and recent results of the European project 'Smart High Lift Devices for Next Generation Wings'
Hans Peter Monner and Johannes Riemenschneider

A Smart Leading Edge Architecture aimed at Preserving Laminar Regime
Salvatore Ameduri

Structural Design of a Smart Leading Edge Device for Seamless and Gapless High Lift Systems
Markus Kintscher, Olaf Heintze and Hans Peter Monner

Aerodynamic Optimization of a Two-Dimensional Two-Element High Lift Airfoil with a Smart Droop Nose Device
Timo Kühn

A Variable Stiffness Skin for Morphing High-lift Devices
G. A. A. Thuwis, M.M. Abdalla and Z. Gürdal

Selectively Deformable Structures for Design of Adaptive Wings "Smart" Elements
G.A.Amiryants, V.A.Malyutin, V.P.Timohin and F.Z.Ishmuratov

Development of Flexible Matrix Composites (FMC) for Fluidic Actuators in Morphing Systems
Johannes Kirn, Thomas Lorkowski and Horst Baier

A Tool Chain for Aero-Elastic Simulations
Mathias Doreille, Thomas Ludwig, Silvio Merazzi, Luca Cavagna and Peter Eliasson

AISHAII Project Presentations

Project overview AISHA II and Detection of corrosive and hydraulic liquids by gauges based on the collapse of percolation conductivity
Helge Pfeiffer, Peter Heer, Martine Wevers

Lamb Wave Mode Conversion for Impact Detection in a Composite Helicopter Tail Boom
Wolfgang Hillger, Artur Szewieczek, Daniel Schmidt, Michael Sinapius

Smart detection system based on piezo-composite transducers for SHM applications
Thomas Porchez, Nabil Bencheikh, Ronan Le Letty, Erling Ringgaard, Tomasz Zawada

Remaining strength and lifetime of the Al alloy aircraft components
Igor Pavelko, Vitalijs Pavelko, S.Kuznetsov, E.Ozolinsh, I.Ozolinsh

Novel methods for structural health and load monitoring by high Resolution ultrasonic time-of-flight detection
W. Grill, et al

FLY-BAG Project Presentations

Development of a novel concept of explosion-resistant cargo container for narrow-body aircrafts
Donato Zangani, Samuele Ambrosetti, Alessandro Bozzolo

Development of composite material concepts for FLY-BAG
Hans Lilholt and Helmuth Toftegaard

Numerical modelling of blast events to design an innovative blast resistant textile luggage container
Rosario Dotoli and Danilo Bardaro

Blast testing of composite and textile elements and FLY-BAG concept validation
Jim Warren, Andrew Tyas, Stephen Fay

Individual Presentations

(11) Non-linear dynamic simulation and experimental validation of sandwich structures
G. Lampeas , Th.Siebert and V. Pasialis

(12) Shape morphing and control of flexible surfaces for aerospace applications
H. Baier, L. Datashvili

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(13) Innovative Design with Bi-Level Topology Optimization
Alain Remouchamps, Michaël Bruyneel, Stéphane Grihon, Claude Fleury

(14) Aircraft structural optimization subject to flight loads – Application to a wide body commercial aircraft configuration
Felix Stroscher, Ögmundur Petersson and Martin Leitner

(15) Cohesive zone model-based simulation of adhesive joint fatigue debonding
A. Pirondi and F. Moroni.

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(16) FEM for assessing the critical velocity in cold spray process
M.Guagliano, R.Ghelichi

(17) Fatigue behaviour of nanostructured surfaces obtained by shot peening
S. Bagherifard, M. Guagliano

(18) Damage modes assessment of pultruded glass fiber reinforced materials with acoustic emission methods
S. Bagheirfard, D. Crivelli, M. Guagliano

Short descriptions of the FP research projects to be presented at the workshop

DAY 1

Immersive interface technologies for life-cycle human-oriented activities in interactive aircraft-related virtual products (VISION)

Virtual Reality (VR) is widely used in engineering tasks in order to simulate cost and time-intensive activities. In aircraft design, efficient execution of man-in-the-loop simulation tasks has been used as means for assessment of the aircraft's lifecycle usage. However, the users of aircraft-related virtual products often feel the full synthetic environment like an unrecognizable ambient and so they reject the immersive simulation as an everyday working practice. This is due to the lack of realism of the virtual environments. VISION uses as a 'baseline' the worldwide academic knowledge and the functionality provided by current world class VR software. It advances the state-of-the art both at technology and application level by improving the performance of aircraft-related virtual products and environments in respect to criteria such as the realism of rendered virtual environment and the quality of user interactions.

The technological objective of VISION is to specify and develop key interface features in fundamental cornerstones of virtual realitytechnology, namely in photorealistic immersive visualization andinteraction. In particular, it aims at removing the current drawbacks ofthe underlying technology and better accommodate the specific needs of thehuman-oriented life cycle procedures (design, validation, and training),related to critical aircraft virtual products (e.g. virtual cabin etc.). Theimmersive interface technologies under development, enhance the engineeringcontext of these virtual products by enabling their increased use foractivities, such as design verification, ergonomics validation,specifications of equipment displays, operational and situational training.Thus, they help address in a more flexible, reliable and cost efficient waythe development phase as well as the safety performance of these products.The human factors perspective on the design of Virtual Reality interfaces isexpected to facilitate the "acceptance" of the new methodologies by new usergroups, and their integration in the everyday business practices. Thetechnological output of the project is expected to have a significant impacton the reduction of aircraft development costs and time to market, as wellas on the improvement of aircraft safety.

DAY 2

More affordable aircraft structure through extended, integrated, and mature numerical sizing (MAAXIMUS)

Even though composite materials are more and more used in modern airframes, many significant improvements are still achievable. Firstly, the substitution of the assembly of many small composite parts by a single one-shot large part provides additional weight reduction. Secondly, the final assembly line process must be adapted to composite properties (lack of ductility, stiffness). Thirdly, if the appropriate level of confidence and cycle time was available, simulation-based design would provide a faster and less expensive path to find the optimal structures than the current development process, which relies on physical tests. Lastly, more conductive composites are necessary to avoid additional weight for system protection. The aim of *MAAXIMUS* (More Affordable Aircraft structure through eXtended, Integrated, & Mature nUmerical Sizing) is to demonstrate the fast development and right-first-time validation of a highly-optimised composite airframe. The *MAAXIMUS* objectives related to the highly-optimised composite airframe are: 50% reduction of the assembly time of large composite sections; 10% reduction of manufacturing & assembly recurring costs; 10% reduction of the structural weight. The *MAAXIMUS* objective related to a faster development is to reduce by 20% the current development timeframe of aircraft structures and by 10% the corresponding cost.

The *MAAXIMUS* objective related to the right-first-time structure is to additionally reduce the airframe development costs by 5% through the delivery of a predictive virtual test capability for large composite structures with a quantified level of confidence, to avoid late and costly changes This will be achieved through coordinated developments on a physical platform, to develop and validate the appropriate composite technologies for low weight aircraft and a virtual structure development platform, to identify faster and validate earlier the best solutions through major improvements in airframe Simulation-base design.

Simulation-Based Corrosion Management for Aircraft (SICOM)

Corrosion management concepts utilising the application and integration of corrosion predictive tools for corrosion occurrence and corrosion propagation will be a driver for new technical advances in the field of corrosion maintenance and in development of new structural designs, materials and processes for surface protection. Additional benefits can be expected by reduced time to market for new products. ***SICOM*** will develop a numerical microscale model to simulate localised corrosion of Al-Alloys with regard to microstructure and the micro-electrochemical condition. It will provide corrosion rates of Al-Alloys in the mesoscale of occluded cells by means of numerical calculation as a function of physical and geometrical factors for given macro-environments to simulate crevice corrosion. A numerical model for prediction of galvanic corrosion behaviour will be developed and upscaled for application to structural elements of aircraft. The influence of surface treatment on modelling results will be included with regard to inhibitor release from protection systems, role of clad layer and oxide degrading effects. A decision support tool will be established to enable exploitation and implementation of the project results in scientific and technical applications. ***SICOM*** will provide models that will become an essential part of future predictive maintenance concepts to avoid unanticipated and unscheduled maintenance with high costs. Data from monitoring systems and non-destructive inspection can be used as model input. Models output will be utilised for the repair decision process or can supply structural integrity concepts & hereby fill the gap between monitoring or inspection and calculation of the structural impact of corrosion. Aircraft development costs will be reduced through saving on testing time and quantity. The prediction models can be combined with expert systems and databases for a more efficient & reliable development and selection of materials.

Cost efficient advanced leading edge structure 2 (COALESCE2)

The objective is to develop new integrated technology and design concepts for fixed leading edge structure to achieve greater than 30% reduction in recurring manufacturing and assembly cost compared to to-day s highly fabricated structure. The Project will explore material and processing technology options for both metallic and composite structural solutions that will result in preferred concepts that best meet the critical structural requirements which are defined in the project. A key requirement will be the cost and simplicity of manufacture; however structural performance, in service maintenance, systems access and environmental impact requirements will also feature in a concept and technology selection process.

The project is subdivided into 5 operational working packages and one management work package, with organisation of WP s running from WP1, definition of requirements, through technology development (WP2), concept design and development in WP3 & 4 and conclusions in WP5. The Project consortium is a well-balanced team of European Aerospace OEM s, all very capable of appropriately assessing and exploiting the competing technologies and design solutions.

ADVance Integrated composite TailCone (ADVITAC)

Following the Strategic Research Agenda top objectives namely to meet society's need and to achieve global leadership for Europe, our consortium propose to address a set of solutions regarding to the following High Level Target Concepts; the cost efficiency air transport system HLTC and the Ultra green air transport system HLTC.
ADVance Integrated Tail Cone deals with aircraft composite structure development and production. The tailcone part has a very special location regarding to aircraft systems. Tail cone is together a component of the aircraft fuselage (ATA 54) and also an interface of the Auxiliary Power System (ATA 49).

ADVITAC project aims at federating a consortium which has an overview of all the set of problems concerning tailcone structure and APU integration. Significant weight and cost savings are expected after all partners issues have been consolidated in a design to cost approach.

ADVITAC project should aim at:

* Lowering production cost by 30% regarding to the actual composite aero structure.

* Lowering weight by 10% regarding to the actual composite aero structure.

* Specify new generation of composite architecture allowing an extensive function integration (acoustic, fireproof, electrical and strength).

* Significantly improve knowledge of interaction between innovative technologies allowing fully automated integrated process including automated dry perform, trough thickness reinforcement and infusion process.

Full-field advanced non destructive technique for on-line thermo-mechanical measurements on aeronautical structures (FANTOM)

The increasing use of composites, sandwich and lightweight structures and parts in new airplanes leads to a need of adapted Non Destructive Testing techniques for such new materials. Various NDT techniques are currently used for flaw detection or mechanical characterization during the development of aerostructures. There is a constant need for improved inspection methods; with increased reliability, rapidity of inspection time and of setting up, and userfriendliness. FANTOM proposes the development of an advanced NDT technique which combines thermography and shearography which are non-contact full-field optical techniques well accepted in the aeronautical sector for composite structures inspection.

The combination is envisaged on the basis of a unique measurement technique using a single sensor instead of a classical approach combining separate sensors. The innovative idea is to develop a holography/shearography sensor in the spectral range of thermographic camera, say at long wave infrared light wavelengths. The state-of-art of components (laser, optics, camera) working in that thermal range is such that one can now envisage such developments with high confidence. Therefore, FANTOM is highly relevant to the objective AAT.2007.4.1.1 of decreasing aircraft development costs through advanced testing tools and methods to improve cost-efficiency and reduce testing time in laboratory and on-ground tests. The successive phases of FANTOM are the definition of specifications, the conceptual design, the development of the critical segments (optical hardware, new high resolution infrared camera and a specific data processing which allows decoupling of thermal and strain informations), the building of a laboratory prototype and its validation on certified samples, and finally the industrial validation in structural test facilities of Airbus and service partner.

Aircraft integrated structural health assessment II (AISHA II)

The safe use of complex engineering structures such as aircrafts can only be guaranteed when efficient means of damage assessment are in place. Whereas the design of civil structures is nowadays based on a damage tolerance approach and time based inspection cycles, it is envisaged that the large cost associated with this approach can be drastically reduced by switching to a condition based maintenance schedule. Structural health monitoring is a technology where integrated sensors are used to enable continuous monitoring of the structural integrity.

In the last years there is an increasing interest in structural health monitoring systems for aircraft. Beside the expected enhancement of safety and maintenance performance, also economic aspects play an important role. This regards on the one hand the reduction of unnecessary inspection costs and on the other hand, the possible weight reduction of aircraft part at the designing phase of an aircraft. This project wants to continue the project "Aircraft Integrated Structural Health Assessment (AISHA) EU-FP6, priority 4 - STREP project nr. 502907) which was dedicated to the establishment of the basic elements of a health monitoring systems based on ultrasonic Lamb waves.

But this project not only focuses on the application of ultrasonic Lamb waves for the determination of defects, also complementary methods, such as electrochemical monitoring, optical fibre techniques and eddy current monitoring will be applied. Finally, diverse experiments on lab-scale and on selected full-scale parts showed the ability of ultrasonic Lamb-waves, eddy current sensors and electrochemical methods to give reliable correlations between physical parameters and relevant damage in structural parts.

Smart high lift devices for next generation wings (SADE)

SADE aims at a major step forward in the development and evaluation of the potential of morphing airframe technologies and contributes to the research work called for the reduction of carbon dioxide and nitrogen oxides emissions through new intelligent low-weight structures. All aerodynamic concepts for significant reduction of drag such as laminarisation require slim high-aspect-ratio wings. However, state-of-the-art high lift systems will suffer from the reduced construction space and do not cope with the required surface quality. Thus, SADE develops suitable 'morphing' high lift devices: The seamless 'smart leading edge device' is an indispensable enabler for laminar wings and offers a great benefit for reduction of acoustic emissions, the 'smart single slotted flap' with active camber capability permits a further increased lift. Thanks to their ability to adapt the wing's shape, both devices also offer aerodynamic benefits for cruise flight.

Morphing devices imply the integration of drive systems into tailored lightweight structures and therefore reduce complexity and mass. Furthermore, focussing on electric actuators the energy consumption can be reduced, which directly reduces the aircraft operational costs as well as the environmental impact. However, the high elasticity required for efficient adaptability of the morphing structure is diametrically opposed to the structural targets of conventional wing design like stiffness and strength. To find the optimum compromise precise knowledge on target shapes for maximum high lift performance and sizing loads is mandatory. Therefore, SADE comprises all relevant disciplines for the investigation of morphing wings and operates a state-of-the-art virtual development platform. Nevertheless, SADE focuses on the structural challenge of realising morphing high lift devices.

SADE builds on available promising concepts for smart structures. The technological realisation and optimisation of these concepts towards the special requirements of full scale systems is the most essential challenge for morphing today. Another challenge results from the aeroelastic condition the structural system is optimised for. Hence, a realistic full scale section of a morphing wing will be manufactured and tested in the TsAGI T101 wind tunnel for an investigation these effects.

Blastworthy textile-based luggage containers for aviation safety (FLY-BAG)

The rise in worldwide terrorism has required measures be taken to harden aircraft against catastrophic in-flight failure due to concealed explosives. Commercial aviation can be protected from the threat of explosives by: 1. preventing explosives from reaching the aircraft 2. mitigating the effects of an explosive protecting the aircraft from an onboard explosion. The risk that a small quantity of an explosive, below the threshold of the detection instruments, could get undetected should be considered, and the introduction of countermeasures to reduce the effects of on-board explosions should be considered.

This is the idea behind FLY-BAG. Hardened containers (HULD) have been developed for the latter scope, but have some disadvantages which prevent their wider utilisation: they are heavier and more costly than standard luggage containers and only applicable to wide-body aircrafts. The issue of containing explosions aboard narrow-body aircraft must be resolved. Our concept is based on the development of flexible textile-based luggage containers able to resist a small to medium explosion by controlled expansion and containment of the shock waves whilst, at the same time, preventing hard luggage fragment projectiles (shrapnel) from striking the main structure of the aircraft at high speed. A multi-layered soft-sandwich structure is required to absorb the large dynamic loads of the explosion and the large deformation related to the gas expansion.

Our idea is to use a multi-axial textile structures made of ballistic yarns as an internal high strength layer, coupled with an external foldable layer which could deform in a controlled way during the explosion, in a way similar to air-bags in cars. Composite elements like thin strips or thin sheets contribute with reinforcement and containment functions. A core layer will be considered as well e standoff distance between an explosive device and the aircraft skin panels to reduce shockholing and blast forces.

Simulation based solutions for industrial manufacture of large infusion composite parts (INFUCOMP)

Today, advanced composites use either layers of plies impregnated with resin (pre-pregs) to form a laminate, or Liquid Composites Moulding (e.g.RTM) of dry textiles. Prepreg composites give superior mechanical properties due to toughened resins and high fibre content, but suffer from high material costs, limited shapeability, complex, expensive and time consuming manufacturing, and limited materials shelf life. Infusion technologies can overcome these limitations, but are not fully industrialised and rely on costly prototype testing due to the lack of simulation tools. Current infusion simulation technologies are approximate and really only suited to small scale components based on adaptations of Resin Transfer Moulding simulation; they are not accurate for large, thick and complex aerospace composites, where one sided tooling and vacuum membranes cause complex 3D heat/flow processes.

The INFUCOMP project will develop the full simulation chain from perform design to manufacture (infusion), process/part optimisation and final part defects/mechanical performance prediction with a focus on the infusion step. The project covers all popular Liquid Resin Infusion (LRI) methods currently used in the Aerospace industry. Although focus is on aerospace applications, the work will be very relevant to other industries. The proposed technologies will allow economical manufacture of high performance, integrated, large scale composite structures; thus, positively contributing to their increased use. Benefits include lower cost, improved performance, greater payloads and fuel/emissions reductions.