



## D5.5 Report on dissemination activities (prop. D6.6)

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### Executive Summary

This deliverable presents the list of papers and events used for information and dissemination activities. It also reports on workshop outcomes.

### Deliverable Contributors

	<b>Name</b>	<b>Organisation</b>	<b>Role in EPICEA</b>
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	All partners provided information regarding their dissemination activities.		

### Summary of contributions

<b>Contributing Partners as defined in DoA</b>	<b>Brief Description of Contribution to the Deliverable</b>
ARTTIC	Wrote the deliverable
ONERA	Reviewed the deliverable
All partners	Provided information regarding their dissemination activities

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**Document History**

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R0.4	10/07/2019	Version with contributions from IDS	DRAFT	Consortium
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## List of Acronyms / Abbreviations Used in this Document

Acronym / Abbreviation	Definition
CASI	Canadian Aeronautics and Space Institute
CFC	Carbon Fibre Composite
CFRP	Carbon Fiber Reinforced Polymer
CR	Cosmic Radiation
CRN	Current Return Network
EM	Electromagnetic or/and Electromagnetics
EMC	Electromagnetic Compatibility
EMCSI	Electromagnetic Compatibility & Signal/Power Integrity
EUROEM	European Electromagnetics
EuCAP	European Conference on Antennas and Propagation
FDTD	Finite Difference Time Domain
FPGA	Field-Programmable Gate Array
FTL	Field to Transmission Line
GASS	General Assembly and Scientific Symposium
GIBC	General Impedance Boundary Condition
HIRF	High-Intensity Radiated Fields
IEEE	Institute of Electrical and Electronics Engineers
LSP	Lightning Strike Protection
MFCM	Multifilament Current Method
MFDCM	Multifilament Doublet Current Method
MIDM	Multiple Infinitesimal Dipole Method
MTLN	Multiconductor Transmission Line Network
NTC	Numerical Test-case
URSI	International Union of Radio Science
SE	Shielding Effectiveness
SGN	Signal-Ground-Network
TAP	Transactions on Antennas and Propagation
TBC	Tensorial Boundary Condition
TIBC	Tensor Impedance Boundary Condition

# 1 Introduction

## 1.1 Purpose

The purpose of this document is to present dissemination activities performed during the EPICEA project. It will present dissemination activities performed during the EPICEA project, with notably a list of papers and events used for information and dissemination activities.

# 2 Dissemination

## 2.1 List of dissemination activities performed during the EPICEA project

All the dissemination activities performed by the EPICEA partners have been registered by ARTTIC on a regular basis into the Dissemination Register on the EPICEA internal collaborative SharePoint platform. This list includes notably the papers and events used for information and dissemination activities.

These activities have been performed in line with the dissemination plan fine-tuned for Canada and for Europe, corresponding respectively to:

- Milestone M6.2 “Dissemination Plan fine-tuned for Canada” achieved at M7.
- Milestone M6.3 (or also MS13 according to the Grant Agreement) “Dissemination Plan fine-tuned for Europe” achieved at M2.

This dissemination plan described the approach/strategy that had been adopted in regards to dissemination actions that were planned to be undertaken during the course of the project. Specifically, this explained the roles of Work Package “Dissemination and exploitation” in support of dissemination actions and presented potential dissemination actions and means available to the consortium (Europe and Canada). It also explained where available dissemination materials were located on the EPICEA internal collaborative SharePoint platform. Finally, it reminded the project members of the rules that govern all dissemination actions that may be undertaken by the project. It was used by partners as the reference for any dissemination activity.

General Assembly approval has been organised with regards to scientific publications and participation to events/conferences to clear any potential issue with on-going patent application.

Below is the list of all dissemination activities performed during the EPICEA project.

### Legend:

Colour	Type of information/dissemination activity
	Posters, articles
	Dissemination/communication material
	Paper in proceedings of a conference/workshop
	Peer reviewed publication
	Public deliverable
	Other (e.g. public website, content disseminated to Advisory Board members)

**Table 1: List of information and dissemination activities performed during the EPICEA project**

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Project Poster for 8 <sup>th</sup> CRIAQ Research Forum	EPICEA	CARIC	A poster of the EPICEA project was presented at the 8 <sup>th</sup> CRIAQ Research Forum, organized in collaboration with CARIC.	8 <sup>th</sup> CRIAQ Research Forum on 27 April 2016	<a href="http://epicea-env714.eu/wp-content/uploads/2016/03/Template_8thForum_Project-EPICEA-VF.pdf">http://epicea-env714.eu/wp-content/uploads/2016/03/Template_8thForum_Project-EPICEA-VF.pdf</a>
Project Summary	EPICEA Project Summary	ARTTIC ONERA	The Project Summary was intended as a support for partners to use in external communication related to the project launch.	N/A	N/A
Project Fiche	EPICEA Project Fiche	ARTTIC ONERA	The Project Fiche was based on the Project Summary to respond to the request of the European Commission to prepare the Project Fiches for the Horizon 2020 Transport Projects which Innovation and Networks Executive Agency (INEA) is managing.	N/A	N/A
Dissemination /communication material ready	N/A	ARTTIC	These documents correspond to the milestone M6.5 (MS15 for European partners) “Dissemination/communication material ready (press kit, templates, PowerPoint presentation, project abstract, template for flyers)” achieved at M6. These templates/documents were intended as support for partners to use in dissemination/communication activities.	N/A	N/A

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Online publication of Interaction Notes	Effects of distributed sources on transmission -lines: low frequency approximations	ONERA	<p>EPICEA European Coordinator ONERA has published online Interaction Notes entitled “Effects of distributed sources on transmission-line models: low frequency approximations” available on <a href="http://ece-research.unm.edu/summa/notes/In/IN628.pdf">http://ece-research.unm.edu/summa/notes/In/IN628.pdf</a>.</p> <p>This paper is related to EPICEA’s WP2, “EM coupling on Interconnected Systems”. Field to Transmission Line (FTL) is an important scenario to be developed in the EPICEA computer platform. With FTL, 3D and wiring calculations can be run separately and linked together, the first calculation providing equivalent source terms to the second one. Among the FTL formalisms, Agrawal’s formalism is of particular interest for numerical implementation with a 3D solver for the 3D calculations. This formalism requires only voltage generators which explains the source restriction which is made in this theoretical paper.</p> <p>From a practical point of view, the method described in this paper allows gathering source distributions along cable paths as constant sources in equivalent intervals, larger than the ones dictated by the sampling of the mesh of the 3D calculation, thereby reducing the memory resources and calculation time in the determination of source wave terms of the BLT equation.</p> <p>As a directly applicable result for EPICEA, this paper provides an equivalent distributed source model, valid for any type of load at the extremity of the transmission line. The equivalent boundaries of the interval are calculated depending on the voltage source spatial distribution. Such a model is valid in the quasi-static approximation applying interval decomposition rules such as in <math>\lambda/10</math>, where <math>\lambda</math> stands for the minimum frequency wavelength of the problem. This new formulation of the equivalent distributed sources will be implemented in the FTL wrappers of the EPICEA computer platform.</p>	Notes on the web	<a href="http://ece-research.unm.edu/summa/notes/">http://ece-research.unm.edu/summa/notes/</a>

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
EPICEA Public Website	N/A	ARTTIC	The EPICEA public website was set-up to present the project, the funding, its achievements and to raise awareness of the stakeholders. It was updated on a regular basis by ARTTIC, based on partners inputs.	N/A	<a href="http://epicea-env714.eu/">http://epicea-env714.eu/</a>
Content disseminated to the EPICEA Advisory Board	N/A	ONERA Partners	<p>These documents were intended to give the Advisory Board members an overview of the project, its objectives and the work achieved, and especially for Andy Marvin who participated to the EPICEA General Assembly - M12 progress review.</p> <p>As requested by the coordinators ONERA and POLY, the Advisory Board members signed an “obligation of confidence” letter before having access to these documents on a dedicated SharePoint platform set-up by ARTTIC.</p>	N/A	N/A
Abstract for the URSI General Assembly	Scalable modeling strategy for EM interactions in Composite Electric Aircraft	POLY	<p>Polytechnique attended the 32<sup>nd</sup> general assembly of the International Union of Radio Science held in Montreal, August 2017. Walid Dyab, postdoctoral fellow at Polytechnique, conducted a 20-minutes oral presentation within a session on electromagnetic compatibility in complex systems. This general assembly and scientific symposium is held every three years and gathers researchers from diverse disciplines in the field of radio science. Polytechnique, with the help of all EPICEA partners took this opportunity to publicize the scientific activities taking place within the frame work of EPICEA.</p> <p>The presentation was titled “Scalable modelling strategy for EM interactions in composite electric aircrafts”. The technical focus was on the hierarchy of the EPICEA platform and specifically on the modelling of interconnected systems within the platform. The frequency bands of interest were explained as well as the way they are divided into low, medium and high frequency bands. Different modules of the EPICEA platform were presented and specific plans for validation based on lab tests were explained.</p>	URSI General Assembly on August 19-26 <sup>th</sup> , 2017	



Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Abstract for the URSI General Assembly	A waveguide-based method for extracting complex permittivity of dielectric Slab by general impedance boundary condition (GIBC)	ONERA; POLY	Polytechnique attended the 32 <sup>nd</sup> URSI GASS conference, which was held in Montreal, 19th-26 <sup>th</sup> August 2017. The International Union of Radio Science (Union Radio-Scientifique Internationale), a non-governmental and non-profit organisation under the International Council for Science, is responsible for stimulating and coordinating, on an international basis, studies, research, applications, scientific exchange, and communication in the fields of radio science. As far as the interest for the EPICEA project is concerned, Polytechnique gave a presentation focusing on a waveguide-based method for extracting complex permittivity of dielectric slab using general impedance boundary condition (GIBC). A GIBC for dielectric slab with arbitrary thickness and conductivity was firstly introduced and then discussed. Then, an X-band waveguide was modelled with inserted material-under-test (MUT) in a software; the simulated results were obtained and applied to GIBC for extracting the complex permittivity. Apart from this, a method to eliminate the phase ambiguity, which commonly associates with thicker samples, was also proposed. Finally, four samples with preset complex permittivity were proposed and simulated, the complex permittivity of each sample was extracted through proposed method and compared with preset value, and a good agreement was obtained, thus validating the proposed method.	URSI General Assembly on August 19-26 <sup>th</sup> , 2017	<a href="http://www.ursi.org/proceedings/procGA17/papers/Paper_K15-5(2653).pdf">http://www.ursi.org/proceedings/procGA17/papers/Paper_K15-5(2653).pdf</a>
Abstract for the ASIAEM conference	Modelling EM-coupling on a massively composite Aircraft	ONERA	ONERA participated to ASIAEM 2017 in Bangalore, India, 24th-27th July 2017. This conference is the Asian edition of the series of AMEREM and EUROEM conferences held in the USA and Europe respectively. As far as the interest for the EPICEA project is concerned, these conferences gather the scientific community of High Power Electromagnetics (HPE) that include lightning and HIRF particular topics. ONERA gave a general presentation of EPICEA focusing on the activity of EM coupling on interconnected systems in massively composite aircraft structures. The modeling methodology based on the EPICEA platform, the computer modules and scenarios as well as material models were introduced. Questions mainly concerned the way to account for	ASIAEM conference on 23-27 July 2017 in India	Web Link no more available

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
			<p>the common mode impedance brought by the structure with the common impedance junction concept introduced in a MTLN network model. Other contacts have been established with EM sensor developers that could get in touch with Bombardier Aeronautics for their future EM tests on aircraft and with users of the CRIPTE software in India for the future applications of this software.</p>		
Paper for EMC Europe 2017	Distributed voltage sources on transmission -lines unified low frequency model	ONERA	<p>ONERA attended the last EMC EUROPE 2017 symposium, organized by ESEO in Angers, France (5th-7th September 2017). EMC Europe is the annual major event for the EMC community in Europe with about 450 attendants coming from the academic and industrial world. ONERA took this great opportunity to present the scientific work carried out in EPICEA in a general session dedicated to “transmission lines” with a paper entitled: “Distributed Voltage sources on transmission lines – Unified low frequency model” by J-P. Parmantier, I. Junqua, S. Bertuol and P. Schickele.</p> <p>This paper addresses the question of modelling voltage source terms when applying Agrawal’s Field-to-transmission Line model in a numerical procedure involving a 3D full wave solvers and Multiconductor Transmission-line Network solvers based on the BLT equation. It particularly stresses the fact that the prima facie model consisting in integrating voltage sources along cells larger than usual criterion of <math>\lambda/10</math> is not valid for some conditions of end loads of the transmission-line. Low frequency applications of simple lines in short-circuit/open circuit allow analytical analysis of the problem. This is a reason why a unified model of equivalent sources is developed here for any type of load conditions and for low frequency applications. Different validations have been carried out applying the CRIPTE code and various illustrations have been presented.</p>	EMC Europe 2017 Angers 04-08 September	<a href="http://emceurope2017.org/T">http://emceurope2017.org/T</a>

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Abstract for CASI-AERO2017 Conference	Multi-scale computation methodologies for electromagnetic scattering from structures made of composite materials for aircraft modelling	POLY	Polytechnique attended the 63 <sup>rd</sup> Aeronautics conference sponsored by the Canadian Aeronautics and Space Institute. The conference was held in Toronto, May 2017. The submitted extended abstract was presented in a poster session by Ahmed Sakr, a PhD candidate at Polytechnique. The presentation was titled, "Multi-scale computation methodologies for electromagnetic scattering from structures made of composite materials for aircraft modelling". The conference gathered major industrial organizations from the field of aerospace manufacturing. The technical work presented by Polytechnique was focused on the theoretical aspects of solving electromagnetic scattering problems for composite materials. The main concern is how to characterize the composite material based on its microscopic structure. Then the concern is how to represent interleaved multi-layers of composites by single homogenized effective permittivity and conductivity material models. The question of interest is whether the homogenized parameters should be isotropic "scalar" or anisotropic "tensor" quantities. From discussions within the conference, it is concluded that due to mechanical restrictions some critical parts in the body of a composite aircraft must have the carbon fibers of the composite material aligned specifically in one direction to satisfy specific stress-handling requirements. As far as Electromagnetics is concerned, this means that the composite material in those parts must be modeled as anisotropic material. The presented paper proposed a simplified simulation technique for such anisotropic composite structures.	CASI-AERO2017 Conference, 16-18 May, 2017, Toronto	<a href="http://emceurope2017.org/T">http://emceurope2017.org/T</a>
Short standard PowerPoint presentation of the EPICEA project	EPICEA	ARTTIC	This short standard PowerPoint presentation of the EPICEA project was prepared for use by partners at any dissemination/communication event.	Any dissemination/communication event	N/A

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Short standard PowerPoint presentation of the EPICEA project	EPICEA	ARTIC	IDS hired a booth at the IEEE International Conference on Antenna Innovation & Modern Technology for, Ground, Aircraft and Satellite Applications in Bangalore (24-26 November 2017) and presented the standard description of the EPICEA project to the booth visitors.	IEEE iAIM 2017, 8-24-26 November 2017, Bangalore, India	<a href="https://www.eucap2018.org/">https://www.eucap2018.org/</a>
Abstract for the IEEE EMC conference	Shielding Effectiveness Analysis of Carbon Fiber Composite Material Using Tensor Impedance Boundary Condition (TIBC)	POLY	Polytechnique attended the 2017 IEEE International Symposium on Electromagnetic Compatibility & Signal/Power Integrity (EMCSI). The conference took place in Washington DC, August 2017. The paper presented a tensor impedance boundary condition (TIBC) for multilayer unidirectional and woven fabric carbon fiber composite materials. This TIBC was deployed for analyzing the shielding effectiveness (SE) of a prescribed composites panel. Propagation constants were firstly obtained in case of the composite material, and then the TIBC was formulated directly through modifying general impedance boundary condition (GIBC). Moreover, the effect of incident angle on TIBC was also discussed herein, and conditions for which the incidence angle effect on TIBC can be neglected were given. Finally, several numerical results were provided and compared with simulations from a commercial software in order to validate the proposed theory, and a good agreement was observed.	IEEE EMC conference August 7-11, 2017, Washington DC	<a href="https://ieeexplore.ieee.org/document/8077883">https://ieeexplore.ieee.org/document/8077883</a>
Short standard PowerPoint presentation of the EPICEA project	EPICEA	ARTIC	IDS hired a booth at the 12th European Conference on Antennas and Propagation in London (8-13 April 2018) and presented the standard description of the EPICEA project to the booth visitors.	EuCAP 2018, 8-13 April 2018, London, UK	<a href="https://www.eucap2018.org/">https://www.eucap2018.org/</a>

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Abstract for IEEE Antenna and Propagation Society / URSI 2018	Oblique Plane-wave Scattering and Shielding Analyses of Cylindrical Shell Made of Carbon Fiber Composites	POLY	Polytechnique attended the IEEE Antenna and Propagation Society / URSI 2018 in Boston (8-13 July 2018) and presented a paper entitled "Oblique Plane-wave Scattering and Shielding Analyses of Cylindrical Shell Made of Carbon Fiber Composites". The paper presents a method to calculate electromagnetic fields scattered by an anisotropic (electric and magnetic) cylinder of arbitrary shape. The advantage of the proposed method is its speed compared to existing state of the art. This work is a spin-off of the EPICEA effort to model scattering by anisotropic multilayer composite materials used in new aircraft.	IEEE Antenna and Propagation Society / URSI 2018, 8-13 July 2018, Boston	<a href="https://ieeexplore.ieee.org/document/8608811">https://ieeexplore.ieee.org/document/8608811</a>
Paper for the French EMC symposium And presentation	Simulation Em cooperative sur un système d'interconnexion dans une structure massivement composite Cooperative Em Simulation on an interconnection system in a composite structure	ONERA AXESSIM	AXESSIM and ONERA participated to the French EMC symposium, Paris, 9-11 July 2018, and presented a paper entitled: "SIMULATION EM COOPERATIVE SUR UN SYSTEME D'INTERCONNEXION DANS UNE STRUCTURE MASSIVEMENT COMPOSITE" by S. Bertuol, I. Junqua, J.P. Parmantier, N. Muot, T. Strub, C. Giraudon. This paper presents the application of an EPICEA cooperative scenario based on the Field-to-Transmission-Line model applying the Agrawal model. It presents the numerical tools as well as the EPICEA computer platform that allows playing this scenario. Results are demonstrated on EPICEA's NTC2 (Numerical Test-case 2), a 3-volume composite carbon rectangular 3D structure equipped with a multiconductor wiring network and a current return network. The 3D calculations are made in FDTD with ONERA's ALICE software and the MTLN calculations are made either in the frequency domain or in the time domain respectively with ONERA's CRIPTÉ or AxesSim's MILO software modules. When the wiring is simplified to one-wire branches validations with full 3D calculations with embedded thin-wire models are possible; some example are showed in the paper. Calculation configurations concern current injection on the 3D structure (indirect effects of lightning) and plane wave illumination (HIRF).	French EMC symposium (https://cem2018.scienceconf.org/, Paris, 9-11 July 2018)	<a href="https://cem2018.sciencesconf.org/">https://cem2018.sciencesconf.org/</a>

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Paper for EMC Europe 2018	Modified FTL approach for High Frequency EM Coupling on Harnesses installed in Complex Structures	ONERA	ONERA attended the EMC Europe 2018 in Amsterdam (27-30 August 2018) and presented a paper entitled "Modified FTL approach for High Frequency EM Coupling on Cables installed in Complex Structures". This paper addresses the modelling of EM coupling at high frequency of cables installed in complex 3D structures. It presents the high frequency methodology proposed and implemented in EPICEA which is based on a field-to-transmission line approach. The incident EM environment in the structure is solved by PoWer Balance techniques. The originality of the strategy lies in the fact that the application of the theorem of reciprocity enables reduction of computer resources for cable network computations. The strategy has been applied and validated on the NTC2 test case.	EMC Europe 2018, Amsterdam, 27-30 August 2018	<a href="https://ieeexplore.ieee.org/document/8485045">https://ieeexplore.ieee.org/document/8485045</a>
Abstract for the AMEREM meeting	Modelling EM-Coupling on a Massively Composite Aircraft Barrel	ONERA	ONERA attended the AMEREM meeting in Santa Barbara (27-31 August 2018) and presented a paper entitled "Modelling EM-Coupling on a Massively Composite Aircraft Barrel". This conference presentation concerns EPICEA's EM coupling on IS activity. It is a follow-up of the paper presented at the same series of conferences in Bengalore, India in July 2017 (ASIAEM). At this time, the context of the project together with its scientific challenges and NTC2 results had been presented. In this AMEREM conference we present the first simulation results obtained with CRIPTE for local injections on the wiring of the EPICEA-barrel with comparisons to measurements (S-parameters). The CRIPTE model of the wiring network is presented together with a CRIPTE model of the Current-Return-Network (CRN) and the Signal-Ground-Network (SGN). The results show the importance of taking into account the connection of the wiring model to the CRN and SGN models. Prospects on the continuation of the project conclude the presentation.	AMEREM meeting in Santa Barbara (http://ece-events.unm.edu/amerem2018/), 27-31 August 2018	<a href="http://ece-events.unm.edu/amerem2018/program/Amerem2018Abstracts.pdf">http://ece-events.unm.edu/amerem2018/program/Amerem2018Abstracts.pdf</a>

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Short standard PowerPoint presentation of the EPICEA project	EPICEA	ARTIC	IDS hired a booth at the Simcenter Conference Europe 2018 in Prague (3-5 December 2018) and presented the standard description of the EPICEA project to the booth visitors.	Simcenter Conference Europe, 3-5 December 2018, Prague, Czech Republic	N/A
Paper for IEEE Transactions on Electromagnetic Compatibility	Scattering and Shielding Analyses of Carbon Fiber Composites-Based Cylindrical Shell Using Multifilament Doublet Current Method (MFDCM)	POLY	Polytechnique submitted a paper entitled "Scattering and Shielding Analyses of Carbon Fiber Composites-Based Cylindrical Shell Using Multifilament Doublet Current Method (MFDCM)" for the IEEE Transactions on Electromagnetic Compatibility. This paper presents a numerical method to analyse cylinders made of multilayer composite materials typically used in aircraft structures. A multifilament doublet current method (MFDCM) is combined with the tensor impedance boundary condition (TIBC) to simulate and analyse scattering and shielding performances of carbon fibre composite (CFC) material based cylindrical shells. The TIBC of a shell made up with the multi-layered CFC material with an arbitrary fibre orientation in each layer is introduced and derived. The MFDCM is subsequently formulated by employing the TIBC to handle numerical calculations with the anisotropic lossy material, such as a multi-layered CFC material, for the first time.	IEEE Transactions on Electromagnetic Compatibility	<a href="https://ieeexplore.ieee.org/document/8444443">https://ieeexplore.ieee.org/document/8444443</a>
Paper for the IEEE Transactions on Nuclear Science	On the Susceptibility of SRAM-based FPGA Routing Network to Ionizing	ETS	EPICEA partner ETS has published a paper in IEEE TRANSACTIONS ON NUCLEAR SCIENCE entitled "On the Susceptibility of SRAM-Based FPGA Routing Network to Delay Changes Induced by Ionizing Radiation" available on <a href="https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&amp;arnumber=8641351">https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&amp;arnumber=8641351</a> . This paper presents the results of investigations on the susceptibility of routing network in SRAM-based FPGAs exposed to ionizing neutron radiation creating single-event upset. A method to configure test circuits mostly with	IEEE Transactions on Nuclear Science	<a href="https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&amp;arnumber=8641351">https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&amp;arnumber=8641351</a>

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
	Radiation		routing resources and few logic resources is presented. Full control over routing resources enables the use of different interconnection types in order to create routing-based oscillators. A method is proposed to route through the 2-D array of switch matrices inside the interconnection network and to automatically identify the involved programmable interconnection points associated with a node. An experimental setup employed to measure delay changes induced by single-event upset to the FPGA routing resources, while it is exposed to ionizing neutron radiation, is described. The proposed setup requires no external equipment instruments for delay change measurement. Experimental results show that our setup is able to measure induced delay changes as low as 5 ps on higher frequency oscillators. Statistical data such as cross sections and mean time to delay change are extracted from the results. With respect to EPICEA, this paper complements the high-level modeling, as it provides a very detailed analysis of this particular impact of cosmic radiation on FPGA routing resources.		
Short standard PowerPoint presentation of the EPICEA project	EPICEA	ARTIC	IDS hired a booth at the 13th European Conference on Antennas and Propagation in Krakow (31 March - 5 April 2019) and presented the standard description of the EPICEA project to the booth visitors.	EuCAP 2019, 31 March-5 April 2019 Krakow, Poland	<a href="https://www.eucap2019.org/">https://www.eucap2019.org/</a>
Public Deliverable D6.2 "EPICEA public workshop in Canada"	EPICEA public workshop in Canada	BA	EPICEA held its public workshop on 17 April 2018 in Montreal at partner Bombardier offices in Canada.  This deliverable presents the outcomes of the EPICEA public workshop in Canada and includes the presentations. It is available on the EPICEA public website.	EPICEA public workshop in Canada	<a href="http://epicea-env714.eu/news-and-events">http://epicea-env714.eu/news-and-events</a>



Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
Paper for the IEEE Transactions on Antennas and Propagation	Two-Dimensional Scattering from Homogenous Anisotropic Cylinders Using a Multifilament Current Method (MFCM)	POLY	This paper has been submitted to the IEEE Transactions on Antennas and Propagation, TAP and is under review. In this paper, an implementation of the multifilament current method (MFCM) to analyze the scattering from homogeneous anisotropic cylinders is introduced. The z-directed electric and magnetic line sources are used to associate with TM and TE polarizations, respectively. The radiation fields of a line source in unbounded space occupied with an anisotropic material are derived in detail. With the help of the derived fields, the application of the MFCM is expanded to anisotropic materials. The scattering field is then obtained in terms of these line sources. Monostatic and bistatic scattering widths of cylinders with and without sharp edge are investigated under different incident wave polarizations and material characteristics. Apart from homogeneous anisotropic cylinders, the scattering from an anisotropic shell-coated PEC cylinder is also straightforwardly analyzed without additional considerations in the formulation. The oscillation phenomenon of filament currents in representing the scattered fields and the ill-conditioned issue of the constructed matrix are also discussed in detail. Numerical results obtained with this proposed scheme are also in good agreement with published ones whereas the proposed technique has its merits on simplicity and conciseness in comparison to existing numerical methods.	IEEE Transactions on Antennas and Propagation	Under review
Article on EPICEA for CORDIS, the Community Research and Development Information Service	EPICEA	ONERA	The article has been written by a journalist working for CORDIS, on the basis of: <ul style="list-style-type: none"> <li>Information he found about the EPICEA project and corresponding work (in public material available on the EPICEA Public Website).</li> <li>The interview held with Jean-Philippe Parmantier (i.e. written questions to which answers were provided by Jean-Philippe).</li> </ul> The article was published in the following release of "CORDIS Results Pack on 'Lifting off for Safer Aviation in Europe'". This publication in CORDIS was an	CORDIS Results Pack on 'Lifting off for Safer Aviation in Europe	<a href="https://cordis.europa.eu/project/rcn/199476/brief/en">https://cordis.europa.eu/project/rcn/199476/brief/en</a>

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
			opportunity to promote the EPICEA project with significant impact.		
Paper for the IEEE Transactions on Antennas and Propagation	Fast Computations of Three-Dimensional Scattering from Uniaxial Objects Using a Multiple Monopole Method (MMoP)	POLY	This paper has been submitted to the IEEE Transactions on Antennas and Propagation, TAP and is under review. The generalized formulations for fast computations of three-dimensional scattering from uniaxial objects using a multiple infinitesimal dipole method (MIDM) are introduced. The proposed technique uses two sets of infinitesimal dipole doublets (IDDs), including two orthogonally polarized electric infinitesimal dipoles, distributed inside and outside of a scatterer to simulate scattered fields. The dyadic Green's functions of uniaxial materials are deployed in the MIDM so as to obtain the scattered fields. The singularity issue in using the dyadic Green's functions is also discussed and eliminated. We also propose a novel double-layered distribution scheme of sources which can handle the scattering from a relatively larger object efficiently and with a good stability in comparison to the traditional single layered distribution scheme. Several numerical examples are presented to study bistatic radar cross section (RCS) responses under different scenarios. Excellent agreements are achieved by comparing numerical results with those obtained from commercial software packages, while the CPU time and the required memory are drastically reduced by using the MIDM. The proposed technique has its merits on simplicity, conciseness and fast computation in comparison to existing numerical methods.	IEEE Transactions on Antennas and Propagation	Under review
Letter for the IEEE Transactions on Electromagnetic Compatibility	TM Scattering and Shielding Effectiveness (SE) Analyses of Slotted Carbon Fiber Composite (CFC)-Based	POLY	This paper has been submitted to the IEEE Transactions on Electromagnetic Compatibility, EMC and is under review. The TM shielding effectiveness (SE) analyses of slotted carbon fiber reinforced polymer (CFRP)-based shells are presented in this letter. The multifilament doublet current method (MFDCM) is deployed to simulate the scattered and penetrated fields in the considered situation. The inner and outer regions of a slotted shell are separated by a hybrid boundary which contains the material and slot parts. The material part is constituted of multilayered CFRP materials whereas the slot part is a virtual boundary. A tensorial boundary condition (TBC) is then constructed to stand	IEEE Transactions on Electromagnetic Compatibility	Under review

Information & dissemination activity	Title of publication/ presentation	Main authors	Description / Link with the EPICEA project	Event or Journal	Link to webpage
	Cylindrical Shells		for the slotted shell with a chain matrix. The MFDCM is subsequently formulated by employing the TBC to estimate the EM performances of interests. Different slot angles of the shell and conductivity of the CFRP material are considered in our numerical calculations. Only TM case is considered herein, yet the TE situation can be handled straightforwardly with a similar formulation.		
Paper for the IEEE Transactions in Instrumentation and Measurements	Composite Aircraft Lightning Strike Protection Damage Evaluation Using Microwave Microscopy	POLY	This paper has been submitted to the IEEE Transactions in Instrumentation and Measurements, and is under review. This work presents a new application of microwave microscopy for the diagnostic of the painted lightning strike protection (LSP) mesh used in composite aircraft skin. A new flexible probe is presented. This probe can sweep over the surface of the composite skin and detect breaks in the LSP laying underneath. It is demonstrated that shielding of the probe feeding lines leads to better balancing and consequently highly improved immunity to the presence of nearby objects. With this new approach, it is possible to localize faults as small as one cut strand under the paint. In addition, this technique features the possibility to measure the paint thickness with a resolution in the order of micrometres.	IEEE Transactions in Instrumentation and Measurements	Under review

## 2.2 Workshop outcomes

EPICEA had planned to organise two workshops during the lifetime of this project, at M27 (public workshop in Canada) and at M42 (final workshop in Europe) to raise the awareness of the stakeholders and end-users customers.

The first public workshop held in Montreal at Bombardier premises on the 17<sup>th</sup> of April 2018 (M27) focused on presenting the project and its results at M27 to the stakeholders as well as the expected results at M42. This corresponds to **milestone MS5 (Public Workshop in Canada)**.

The final workshop held at ONERA Toulouse centre on the 13<sup>th</sup> of June 2019 presented the project results to stakeholders and end-users customers. This included notably the roadmap for further development up to the necessary Technology Readiness Level (TRL) for commercial exploitation in Composite Electric Aircraft (CEA) and the benefits from Europe-Canada cooperation. This corresponds to **milestone MS8 (Workshop in Europe)**.

These two events were successfully held and the corresponding milestones were successfully achieved. They were key events of the dissemination activity to raise the awareness of the other end-user customers. These two workshops also enabled to capture comments, feedback and/or recommendations from the audience.

The detailed outcomes of the workshops can be found in:

- [Deliverables D6.6: EPICEA Public Workshop in Canada](#) available on the EPICEA public website.
- Deliverable D5.6: EPICEA Final workshop in Europe (prop. D6.7) submitted on the EC portal.

### **3 Conclusion**

This document presented the dissemination activities performed during the EPICEA project, especially the list of papers and events used for information and dissemination activities.