

## Clean Sky2 Workshop

on

# *Advanced Low NO<sub>x</sub> and Hydrogen Combustion Technologies*

2<sup>nd</sup> Edition

Virtual Event

April 29th-30th 2021

### **Background & scope**

After the success of the first edition held in February 2020, we are happy to announce the 2<sup>nd</sup> edition of this workshop. The event will give a dissemination opportunity to many relevant research projects funded by the Clean Sky 2 programme and by H2020 framework (either closed or ongoing), but it will also permit to bring together the combustion experts around Europe to discuss the relevant items **to set-up a roadmap for future combustion technology** in general for the next decade(s).

The proposed agenda covers the following topics:

- Keynote talk about aviation climate impact
- Low NO<sub>x</sub> combustion technologies (including computational and experimental work)
- Advanced combustion technologies
- Particulate matters
- Hydrogen combustion

Most of the Day 2 contributions will be dedicated to future **hydrogen** applications with some fundamental perspectives from most important aero-engine manufacturers.

Attendance is very much welcome, expecting contributions at the level of the discussion at the end of Day 2 with a view to establish a draft **roadmap**, based on the first draft issued last year. To this aim, a round table is organised to collect your vision of priorities in terms of research for the next Framework Programme and for the next decade(s), i.e. for **mid-term EIS (2035)** and for **long term EIS (2050)**.

Due to travel restrictions caused by COVID-19 pandemic the workshop will be given as a virtual event.

**J.F. Brouckaert**

Chief Scientific Officer, Clean Sky 2 JU

**A. Andreini**

University of Florence

**WORKSHOP AGENDA**

DAY 1 – APRIL 29

9.00	9.15	<b>WELCOME AND INTRODUCTION</b> <b>Jean-Francois Brouckaert</b> , <i>Clean Sky2 JU</i> <b>Antonio Andreini</b> , <i>University of Florence (Italy)</i>
<b>KEYNOTE</b>		
9.15	10.00	<b>AVIATION CLIMATE IMPACTS AND A REVISION OF THE AVIATION NOX IMPACTS</b> <b>Volker Grewe / Sigrun Matthes</b> , <i>DLR (Germany)</i>
<b>SESSION 1: LOW NOX TECHNOLOGIES</b>		
10.00	10.30	<b>LEAFINNOX - LEAN AZIMUTHAL FLAME AS AN INNOVATIVE AVIATION GAS TURBINE LOW-NOX COMBUSTION CONCEPT</b> <b>Epaminondas Mastorakos</b> , <i>University of Cambridge (UK)</i>
10.30	11.00	<b>CHAIRLIFT – COMPACT HELICAL ARRANGED COMBUSTORS WITH LEAN LIFTED FLAMES</b> <b>Rainer Koch / Stefan Harth</b> , <i>KIT - Karlsruhe Institute of Technology (Germany)</i>
<b>Coffee break</b>		
11.30	12.00	<b>DENOX: MODELING, STUDYING AND MODIFYING OF NOX GENERATION AND SUPPRESSION PROCESSES IN STIMULATED FLAMES</b> <b>Dmytro Dolmatov / Igor Rybalchenko</b> , <i>National Aerospace University "KhAI" (Ukraine)</i>
12.00	12.30	<b>UREA-BASED NANOEMULSIONS AND THEIR APPLICATION AS FUEL ADDITIVES FOR CLEAN AVIATION</b> <b>Maria Grazia De Giorgi</b> , <i>University of Salento (Italy)</i>
<b>Lunch break</b>		
<b>SESSION 2: ADVANCED COMBUSTION TECHNOLOGIES</b>		
14.15	15.00	<b>ROLLS ROYCE LOW EMISSION ADVANCED COMBUSTION TECHNOLOGIES</b> <b>Marco Zedda</b> , <i>Rolls Royce (UK)</i>
15:00	15:30	<b>LOW EMISSION ADVANCED COMBUSTION TECHNOLOGIES</b> <b>Christophe Viguiet / Matthieu Rullaud</b> , <i>SAFRAN HE / SAFRAN AE (France)</i>
15:30	16:00	<b>GE AVIATION LOW EMISSION ADVANCED COMBUSTION TECHNOLOGIES</b> <b>Antonio Peschiulli / Thomas Ripplinger</b> , <i>AvioAero (Italy) / GE Aviation (Germany)</i>
16:00	16:15	<b>POTENTIALS OF STEAM-INJECTED AND WATER-RECOVERING GAS TURBINE</b> <b>Oliver Schmitz</b> , <i>MTU (Germany)</i>
16:15	16:30	<b>PRESSURE GAIN COMBUSTION AND THE INSPIRE RESEARCH NETWORK</b> <b>Antonio Andreini</b> , <i>University of Florence (Italy)</i> - <b>Myles Bohon</b> , <i>TU Berlin (Germany)</i>
<b>Coffee break</b>		
<b>SESSION 3: PARTICULATE MATTER</b>		
16:45	17:15	<b>ESTIMATE</b> <b>Daniel Mira</b> , <i>BSC - Barcelona Supercomputing Center (Spain)</i>
17:15	17:45	<b>RAPTOR</b> <b>Ayce Celikel</b> , <i>ENV-ISA (France)</i> / <b>Andrew Crawford</b> , <i>University of Cardiff (UK)</i>
17.45	18.00	Closure of Day 1

**WORKSHOP AGENDA**

DAY 2 – APRIL 30

9.00	9.30	<b>THE SOPRANO H2020 PROJECT</b> <b>Klaus-Peter Geigle, DLR</b>
<b>SESSION 4: HYDROGEN</b>		
9.30	10.00	<b>ENABLE-H2</b> <b>Devaiah Nalianda / Andrew Rolt / Xiaoxiao Sun, Cranfield University (UK)</b>
10.00	10.30	<b>SIMULATION AND CONTROL OF HYDROGEN COMBUSTION: THE ERC SCIROCCO PROGRAM</b> <b>Thierry Poinsoot, CERFACS (France)</b>
10.30	10.50	<b>GE AVIATION PERSPECTIVES ON HYDROGEN BASED PROPULSION</b> <b>A. Peschiulli / T. Ripplinger, AvioAero (Italy) / GE Aviation (Germany)</b>
<b>Coffee break</b>		
11.15	12.00	<b>ROLLS-ROYCE PERSPECTIVES FOR HYDROGEN BASED PROPULSION</b> <b>Marco Zedda, Rolls Royce (UK)</b>
12.00	12.30	<b>CARBON-FREE AIR TRANSPORT CHALLENGES</b> <b>Pierre-Alain Lambert / Nicolas Jeuland, SAFRAN Tech / SAFRAN Innovation (France)</b>
<b>Lunch break</b>		
14.00	14.30	<b>ULTRA-LOW NOX HYDROGEN AND SYNGAS COMBUSTOR DEVELOPMENT AND TESTING CAPABILITIES</b> <b>C. Oliver Paschereit, TU Berlin (Germany)</b>
14:30	15:00	<b>ONERA COMBUSTION TEST FACILITIES FOR AERO GASTURBINE ENGINES TO SUPPORT LOW NOX AND HYDROGEN INITIATIVES</b> <b>A. Mohamed, F. Guichard, N. Bertier &amp; O. Dessornes, ONERA (France)</b>
15:00	15:30	<b>PROMISING DESIGNS OF ADDITIVELY MANUFACTURED BURNERS FOR HYDROGEN-FUELLED COMBUSTION CHAMBERS IN AIRCRAFT ENGINES</b> <b>Fabrice Giuliani, Combustion Bay-One, Graz (Austria)</b>
<b>SESSION 5: ROUND TABLE</b>		
15:30	17:30	<b>ROUND TABLE DISCUSSION TO ESTABLISH A FUTURE TECHNOLOGY ROADMAP FOR COMBUSTION TECHNOLOGIES FOR MID-TERM (EIS 2035) AND LONG-TERM (EIS 2050) TECHNOLOGY GOALS.</b> <b>Jean-Francois Brouckaert, Clean Sky 2 JU</b>
17:30	18:00	<b>WRAP-UP AND CONCLUSIONS</b> <b>Jean-Francois Brouckaert, Clean Sky2 JU</b> <b>Antonio Andreini, University of Florence (Italy)</b>

## **Registration**

Please register by filing the online registration form available at:

[REGISTRATION FORM](#)

In case of technical issues with the registration form please register by email to:

Antonio Andreini – [antonio.andreini@unifi.it](mailto:antonio.andreini@unifi.it)

Cc: [Jean-Francois.BROUCKAERT@cleansky.eu](mailto:Jean-Francois.BROUCKAERT@cleansky.eu)

**REGISTRATION DEADLINE: April 27th, 2021**

## **Virtual event**

The workshop will be organized and managed as virtual event using the Cisco Webex meeting platform available at the University of Florence

- ➔ The Webex event links for the two days of the workshop will be sent to registered participants by email

*\* **Disclaimer:** Please be aware that the registration list (name, email, affiliation) will be shared with other participants of the Clean Sky 2 Workshop on Low NOx and Advanced Combustion Technologies. Should you wish for your name and contact details not to be disclosed please contact by email: [antonio.andreini@unifi.it](mailto:antonio.andreini@unifi.it)*

*PDF version of the presentations will be collected and distributed to participants as Workshop proceedings*