

EU-UKRAINE OPPORTUNITIES FOR COLLABORATION IN AVIATION RESEARCH

- **CleanSky2**
- **UA representation in decision-making bodies**

Igor Rybalchenko, KhAI
Head of International STI Project Office





Clean Sky 2

<http://www.cleansky.eu>

What is CleanSky2?

- ❑ **Largest European programme in aviation (€4 billion)**
- ❑ **Joint Technology Initiative (JTI) – EU and leading aviation industry**
- ❑ **Public-Private Partnership (PPP) – EU funding + Industry funding**
- ❑ **Continuation of CleanSky1 (FP7)**
- ❑ **Integral part of H2020**

CS2 Goals

- **New generation of aircrafts – development and demonstration**
- **Emissions cut - CO2 at 50%, NOx at 80%, noise at 50%**
- **Integration of various innovations at aircraft/system level**
- **EU sustainable development in such high-tech field of industry**
- **Global competition winner**



Green Regional Aircraft



SMART Fixed-Wing Aircraft



Green Rotorcraft



EUROCONTROL
EASA



Sustainable and Green Engines



Systems for Green Operation



Eco-Design

LPA – Large Passenger Aircraft



Advances in Wings, Aerodynamics and Flight Dynamics

GRA – Green Regional Aircraft



Drastically reduce the environmental impact, adopts innovative solutions across several technology domains.

Fast Rotorcraft IADP



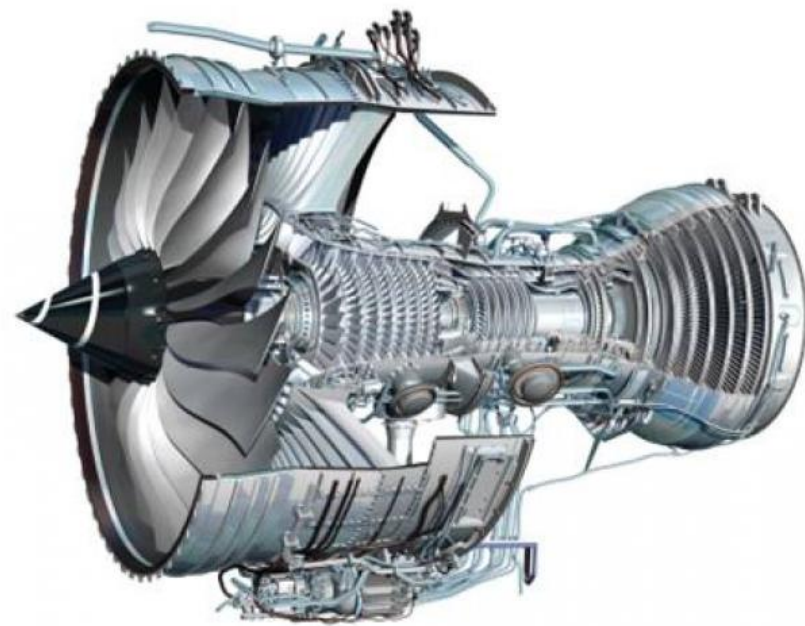
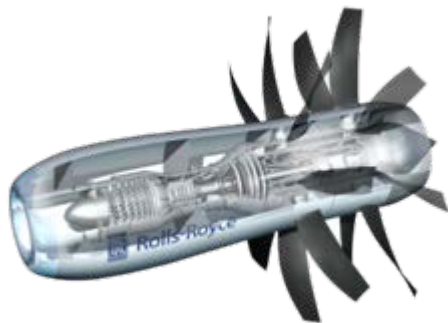
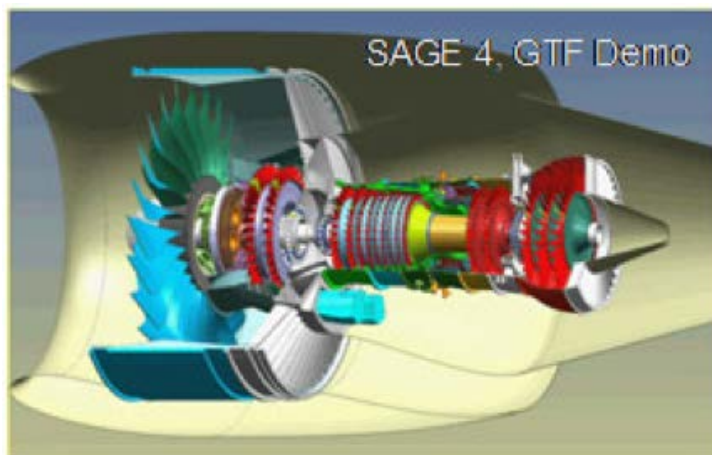
Innovative Civil Tiltrotor technology demonstrator

Small Air Transport (SAT)



‘Fixed wing’ aircraft with between 4 and 19 seats, and have the agility to take off and land in tiny regional or even remote utility airports

Sustainable and Green Engines (SAGE)





Clean Sky 2

Founding Members



Overall CS2 Implementation

720

More than ~~720~~ entities As of CfP09
Leaders named in regulation: 16
Core Partners via open calls: 192 (incl. Affiliates and Third Linked Parties)
Partners via open calls: approx. 500

...including Call 8 Results

1094 ~~52~~ participations



250

INDUSTRY MEMBERS



246

SMEs



232

RESEARCH CENTRES



184

UNIVERSITIES



27

COUNTRIES



107

REGIONS



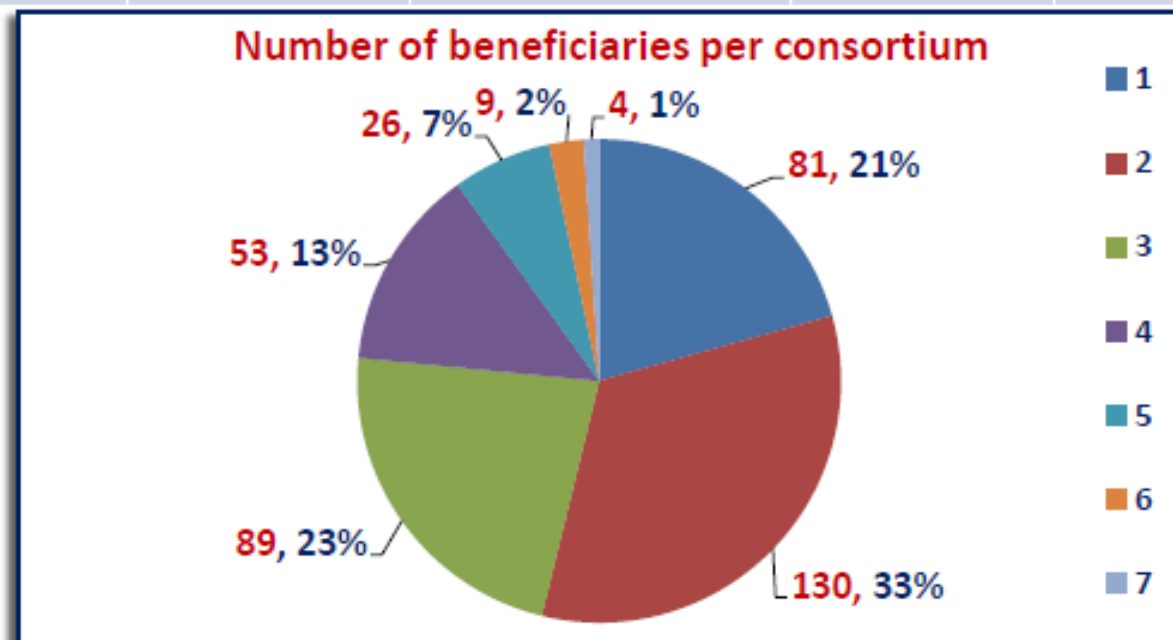
275

GRANTS



Action 1809-01 (I) – GAPs composition

GAPs single entity/consortia	# GAPs CS1	#GAPs CS2 CfPs (01-08)	% CS1	% CS2
1	197	81	41	21
2	148	130	31	33
>2	97	114	20	29
>2 with at least 3 MS	40	68	8	17
Total	482	393	100	100



10th Call for Partners (CfP10):

Area	No. of topics	Funding (M€)
IADP Large Passenger Aircraft	19	20,07
IADP Regional Aircraft	3	1,35
IADP Fast Rotorcraft	4	6,4
ITD Airframe	18	12,925
ITD Engines	2	2,350
ITD Systems	13	10,32

**NOW
AVAILABLE!**

NEW! – 4 thematic topics (7 M €)

Detailed topics description at:

https://www.cleansky.eu/sites/default/files/inline-files/CS-GB-2019-04-09%20Annex%20VI%20CFP10%203rd%20Amd%20WP%20R1%20V2_preliminary%2012032019.pdf

Ukraine in CleanSky2

- **Ukrainian entities – > eligible since March 2015**
- **Sept. 2015 (CFP02) – Dec. 2018 (CFP09):**
 - **13+ proposal submitted (with UA partners)**
 - **4 proposals retained in reserve list**
 - **2 proposals selected for funding**

CS2 - UA Success Stories



European
Commission

Horizon 2020
European Union funding
for Research & Innovation



AMBEC

ADVANCED MODELLING METHODOLOGY FOR BEARING CHAMBER IN HOT ENVIRONMENT

This project has received funding from the Clean Sky 2 Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 785493

AMBEC in brief

- Call: H2020-CS2-CfP06-2017-01
- Topic: ENG-01-15 “Bearing chamber in hot environment”
- Project type: RIA
- Duration: 01/05/2018 – 30/04/2021
- Budget: 1 699 669 Euro
- Topic manager: SAFRAN Aero Engines

AMBEC team:

Advanced knowledge & Proven capabilities

STCU: R&D projects facilitation,
administration & management

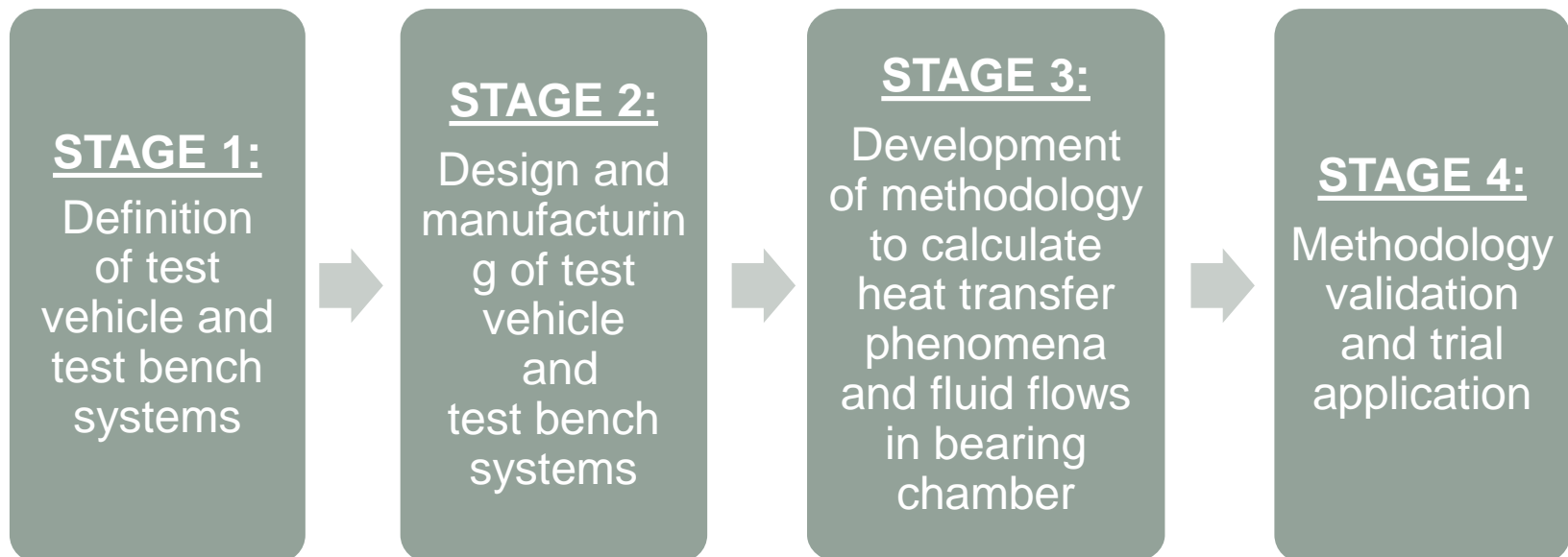
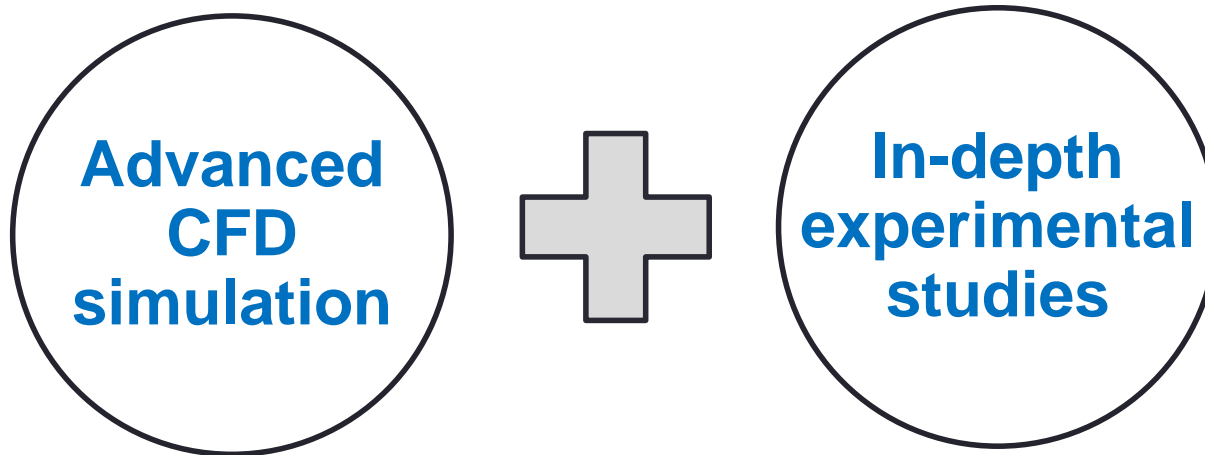
Ivchenko-Progress:
design & development of aviation
and industrial GTEs

Motor Sich: serial production of
aviation and industrial GTEs

KhAI: fundamental & applied
research in the field of complex
thermal engineering systems



AMBEC concept





European
Commission

Horizon 2020
European Union funding
for Research & Innovation



DeNOx

NOx-Free Aeroengine

This project has received funding from the Clean Sky 2 Joint Undertaking under the European Union's Horizon 2020 research and innovation programme under grant agreement No 831848



Innovative Technologies of Electrochemical Suppression and Electromagnetic Decomposition for NOx Reduction in Aeroengines

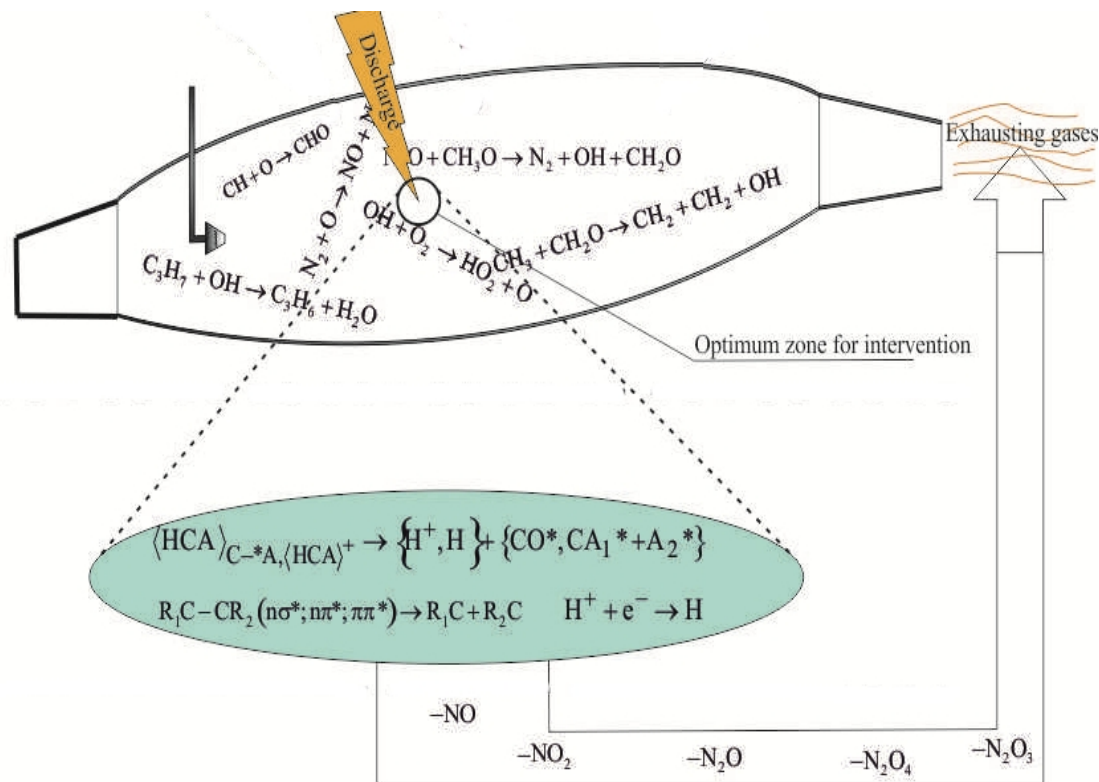
Started 1/01/2019, 48 months, 2 Partners

- **Science and Technology Center of Ukraine (STCU) – Coordinator**
- **National Aerospace University “KhAI”**
- **Project Officer – Jean-Francois Brouckaert**
- **Budget: 997 500 Euro**

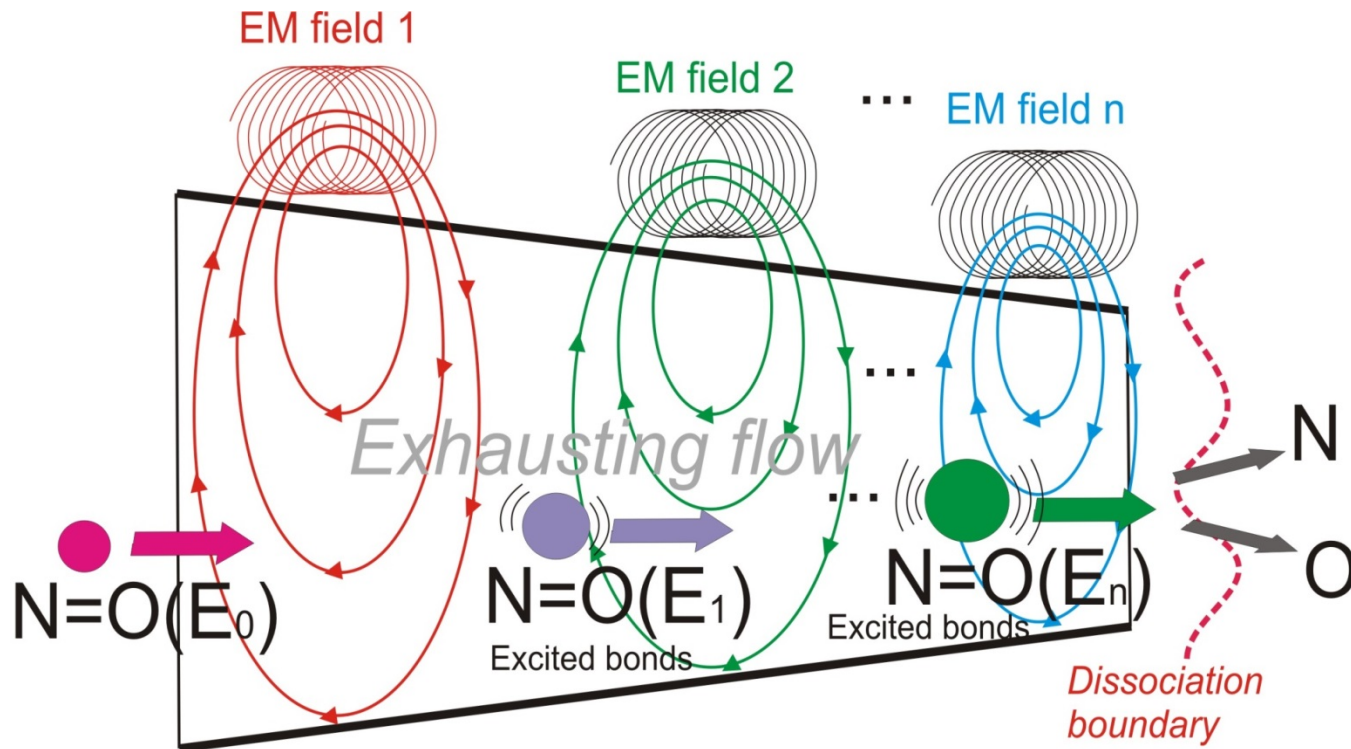
Project aim:

- **Develop and prove breakthrough concepts for drastic reduction of NO_x emissions**
- **#1: Electrochemical suppression of NO_x generation in primary combustion zone**
- **#2: Electromagnetic decomposition of NO_x molecules in engine exhaust**
- **Target TRL at the end of project - 3**

Electrochemical suppression of NO_x in primary combustion zone



Electromagnetic decomposition of NO_x molecules in engine exhaust



Ukrainian involvement in strategic EU aviation research decision bodies

- **H2020** “Smart, green and integrated transport” – Ukrainian national representative(-s) and experts in the Programme Committee
- **ACARE** - Ukrainian observer or associate membership of the ACARE General Assembly
- **CleanSky2** - Ukrainian membership of the Clean Sky 2 States Representative Group



H2020 “Transport” Programme Committee Representatives/Experts

- Ministry of Education and Science of Ukraine
- 1st official call 29 Aug 2017 – no results
- 2nd call 20 Nov 2017 – no results
- 3^d call 26 Jan 2018 results:
 - ✓ **Prof. Sergey Peresada** (Kyiv Polytechnic University) was selected as an expert
 - ✓ Programme Committee Member not selected again

- Top level group of EU aviation experts
- High-level, long-term strategy development (SRIA, FlightPath 2050) => H2020 and CleanSky
- 113 participants
- General Assembly includes Member States Groups
- Several contacts with ACARE secretariat, MSG members, MESU etc.
- **Mr. Victor Shulepov (UkrRIAT) was nominated by MESU as MSG observer**

Ukrainian involvement in CS2 SRG

- Nomination letter from MESU to CS2 State Representative Group (SRG)
- Nomination accepted by CS2JU – Oct 2018
- **Achievement: Ukraine has a representative in CS2 SRG**
 - Representative: Mr. Igor Rybalchenko (KhAI)
 - Alternate: Mr. Mykola Lubiv (STCU)

CS2 SRG Activities

- SRG meeting in Lisbon participation – Nov 2018
- SRG meeting report sent to MESU (Vice-Minister)
- Ukrainian S3 (Smart Specialisation Strategy) development revival
- Negotiation concerning CS2-UA MoA initiated
- Next CS2 Call for Partners topics under discussion
- CS2 project submission consulting for UA applicants
- CS2 Forum in Brussels – 9-10 Mar 2019





National Aerospace University "KhAI"
Kharkiv, UKRAINE

Contacts:

Igor Rybalchenko

17 Chkalova str.

61070 Kharkiv, Ukraine

+38 057 788-4060

iar@khai.edu