

# Clean Sky 2 Initiative: developing a new generation of greener aircraft

- New environmentally friendly technologies for next generation aviation;
- New market opportunities and jobs;
- Underpinning European international aviation competitiveness;
- Speed up development of technology demonstrators.



## What is the challenge?

Air traffic contributes today about 3% to global greenhouse gas emissions, and it is expected to triple by 2050. Although other sectors are more polluting (electricity and heating produces 32% of greenhouse gases), pollution from air traffic is released high in the atmosphere where the impact is much greater. Meeting the EU's climate and energy objectives will require reducing drastically the sector's environmental impact by reducing its emissions. Maximising fuel efficiency to use less to go farther is also a key cost-cutting factor in a very competitive industry – and as air traffic increases, better noise reduction technologies are needed. But game-changing innovation in this sector is risky, complex and expensive, and requires long-term commitment. This is why all relevant European stakeholders must work together to develop proof-of-concept demonstrators.

## What is the Clean Sky 2 (CS2) Initiative?

CS2 is a Joint Technology Initiative (JTI) bringing together companies, universities, public laboratories and innovative SMEs. It will develop and demonstrate new break-through technologies for the civil aircraft market to cut aircraft emissions and noise, and secure the future international competitiveness of the European aviation industry.

The new CS2 JTI is expected to start on 1 January 2014

and end in 2024. It will bring together Europe's aeronautics industrial leaders and public research organisations.

## What results and benefits do we expect?

The technologies developed under CS2 will reduce environmental pollution and noise levels and will therefore impact positively on the quality of life and public health. The close collaboration between the partners of CS2 will accelerate the pace of technological progress and create a mutual win-win situation.

CS2 will help Europe's aeronautics sector remain competitive. Europe currently has a world market share of 40% and the global aviation sector is expected to grow by 4-5% per year. But faced with fierce competition Europe needs to develop new technologies to create new market opportunities and new highly specialised jobs.

For the EU-13 countries the new, enlarged JTI will offer more opportunity to their stakeholders to participate in building the best technologies.

### Specific objectives include:

- increasing aircraft fuel efficiency, thus reducing CO<sub>2</sub> emissions by 20 to 30%; and
- reducing aircraft NO<sub>x</sub> and noise emissions by 20 to 30% compared to "state-of-the-art" aircraft entering into service as from 2014.

## What will the new total budget be?

The estimated budget of CS2 is €4.05 billion. The EU will contribute with €1.8 billion from the Horizon 2020 programme budget. The industrial partners will contribute with €2.25 billion, €1 billion of which through additional activities that are not included in the work plan of the JTI but that contribute to its objectives.

## How will it be run?

JTIs are partnerships between the EU and industry. They establish their own strategic research agendas. The new CS2 JTI will be managed by a dedicated Joint Undertaking whose Governing Board comprises representatives of the European Commission and Aeronautics Industry.

40% of the funds will be allocated to founding members of CS2 who will lead the technical programme and commit for the whole duration. 30% will be allocated to core partners selected via open calls procedure at the start of the programme. 30% of funds will be distributed via annual open calls to support the specific tasks.

## What has the current JTI achieved so far?

It is estimated that the technology developments already made or in progress could reduce aviation CO<sub>2</sub> emissions by more than 20% with respect to Year 2000 baseline levels (an aggregate reduction of 2 to 3 billion tonnes of CO<sub>2</sub> over the next 35 years).

All technologies and demonstrators developed in the Clean Sky programme will represent major steps forward. Examples so far include the Open Rotor, laminar wings, innovative rotor blades and high compression engine for light helicopters, innovative ice detector sensors and advanced avionics systems.

CS JTI was set up in 2008 as Europe's largest aeronautics research programme ever (budget €1.6 billion). It has already brought together over 560 participants where around 40% are SMEs.

## New technologies to reduce aircraft emissions and noise

In 2012 wind tunnel testing successfully validated a number of potential breakthrough technologies. One of these is the so-called Natural Laminar Flow wing. This new wing has the potential to substantially reduce drag and provide up to 4% fuel savings, but requires extensive changes to conventional wing design and manufacturing concepts, which makes these tests vital to reduce the risks of further development. Two other innovative technologies developed under Clean Sky, the Open Rotor (an innovative type of aircraft engine) and wing anti-icing and de-icing systems, also underwent successful wind tunnel testing and demonstrated first level of maturity. Rolls-Royce and SNECMA have now independently performed a series of tests to assess the characteristics of their own Open Rotor designs, and performance and aero-acoustics tests on a complete engine model were also successfully carried out.

More information:

On Natural Laminar flow

[www.cleansky.eu/content/page/sfwa-demonstrators](http://www.cleansky.eu/content/page/sfwa-demonstrators)

On Open Rotor

[www.cleansky.eu/content/page/sage-1-%E2%80%93-open-rotor](http://www.cleansky.eu/content/page/sage-1-%E2%80%93-open-rotor)

[www.cleansky.eu/content/page/sage-2-%E2%80%93-geared-open-rotor](http://www.cleansky.eu/content/page/sage-2-%E2%80%93-geared-open-rotor)

Sky Line magazine

[www.cleansky.eu/sites/default/files/documents/skyline\\_newsletter\\_9.pdf](http://www.cleansky.eu/sites/default/files/documents/skyline_newsletter_9.pdf)



Open Rotor: Clean Sky's innovative aircraft engine demonstrator

## Useful links

Clean Sky: [www.cleansky.eu](http://www.cleansky.eu)

ITD leaders: [www.cleansky.eu/content/homepage/about-us](http://www.cleansky.eu/content/homepage/about-us)

ACARE: [www.acare4europe.com](http://www.acare4europe.com)

ASD: [www.asd-europe.org](http://www.asd-europe.org)