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"Towards a Global Vision for Aeronautics"

ICAS Workshop
Sorrento, Italy
October 6, 2003

Summary Report
Edited by A Gustafsson
February 2004

LIST OF CONTENT

1. Introduction and Summary

During the last few years a number of visionary and strategic documents on the future of aeronautics have been developed world-wide. What they all have in common is a focus on societal needs and some key challenges for aeronautics to meet those needs.

In connection with the meeting of the ICAS Programme Committee, early October 2003 in Sorrento - Italy, a one-day workshop was held on the theme: "Towards a Global Vision for Aeronautics".

A number of additional individuals from Europe and US were invited - see invitation letter in Appendix A. A final list of attendees is included as Appendix B. Unfortunately some US participants could at the end not attend, due to a hurricane storm on the US east coast.

The WORKSHOP GOALS/OBJECTIVES were stated as follows:

- Identify things that are of common interest (or differs)
- Develop creative ideas regarding a global vision for these key challenges

The speakers were asked to focus on "key aviation challenges" like safety & security, environmental goals, ATM-issues - issues for which a global vision should be very useful.

The Workshop Programme is included on the next page. After general overview presentations from Europe (ACARE – Strategic Research Agenda presented by D Schmitt – REF1), USA (NASA - Aeronautics Blueprint presented by J. Hefner – REF2) and Japan (Japan: Aircraft Industry and Aeronautical Research Plan - presented by S. Suzuki – REF3) the programme was continued with three panels each including presentations and discussions.

The presentations made are copied in Appendixes C and are available on a CD-Rom. Each panel was summed up by a rapporteur and these summaries are included as Chapters 3-5.

A few statements from each panel summary are included below:

<u>Panel 1: Environmental Goals</u>

…. environmental issues will limit the growth of civil aviation. ……..An overarching question: is today's atmospheric science sound enough to use as a basis in setting policy?

…. political discussion at present is totally in terms of CO_2; regulators need to be sensitive to the complexity of the problem, and the importance of NO_X and contrails in the overall discussion.

.... the observation that there are clearly different views between the US and Europe on climate change issues.

…. Breakthrough changes will occur only with incentives for change. The role of the scientific community is to understand all the issues. Incentives for change will come from the regulators; they need to understand the facts of the situation.

Panel 2: Safety and Security

…. The safety objective requires an 80% reduction in the accident rate and the security objective is to ensure there are no successful hijacks.

…. There appear to be no technology inhibitors to developing the necessary affordable, automatic and certifiable aids. The implementation of a global systematic approach, addressing social factors and supported by public authorities, is recognised as the major challenge.

…. an overview of the proposed European EUR 60 million research and technology program on security called “For a Secure Europe in a Better World”. Many of the objectives are similar to those of existing or planned US programs, so it is anticipated that a link with US activities in this area would be established.

Panel 3: ATM-issues

….The main problem is that nobody owns ATM because it does not generate money, it only generates delays, so that no one is taking decision. Political persons are more interested by noise concerns because complaining airport neighbours are potential voters. Only when the system comes to a gridlock again, the public will no longer tolerate the situation, then and only then it will become a political issue.

…. The first objectives in this field are to better identify customers, to find important drivers to promote a jump in ATM research and need for leadership in ATM.

In conclusion the presentations and discussions were found most valuable and it was concluded that continued dialogues are of great importance to reach a global vision for these key challenges. ICAS will continue to provide a platform for such dialogues.

Acknowledgment

The workshop was sponsored by the European Commission through the ASTERA project as a SRA Dissemination Workshop.

2. Workshop Programme

ICAS Sorrento Workshop - October 6, 2003
"Towards a Global Vision for Aeronautics"

Programme
Moderators and speakers

08.30 - 10.30 Overview session	Moderator: Billy Fredriksson
Europe: Vision 2020/ACARE SRA	Dieter Schmitt
US: Blue Ribbon etc	~~Darrel Tenney/~~Jerry Hefner
Japan: Aircraft Industry and Aero Research Plan	Shinji Suzuki
10.45 - 12.15 Panel 1: Environmental Goals	Moderator: John Green
Europe:	Christian Mari
US:	~~Lourdes Maurice~~/Ron Bengelink
Others:	John Green
13.30 - 15.00 Panel 2: Safety and Security	Moderator: Wolfgang Schmidt
Europe:	T.K. Huynh
US:	Dimitri Mavris
Others:	Wolfgang Schmidt, Gennady Amiryants
15.15 - 16.45 Panel 3: ATM-issues	Moderator: Ron Bengelink
Europe:	Jan van Doorn
US:	~~Darrel Tenney~~/Jerry Hefner
16.45 - 17.00 Summing up	

3. Summary Panel 1 – Environmental Goals

[Moderator: John Green Rapporteur: Raymond Cosner]

Presentation by C. Mari

Viewfoils from the presentation are included as REF 4

The first speaker was Christian Mari (SNECMA) speaking about "The Next Twenty Years: The Challenge of Environment in Europe". He presented a summary of the first European Strategic Research Agenda (SRA1) Working Team 2 on the environment. This SRA sets the following goals:

- Reduce CO_2 generated by aviation per passenger-km by 50%
  - This is being addressed through more efficient aircraft (improved aerodynamics, weight reduction), improved engines, air traffic management, and alternative fuels.
- Reduce perceived noise by 50%
  - Addressed through quiet aircraft, future rotorcraft, noise abatement procedures, and community impact management.
- Reduce NO_x emissions by 80%
  - Addressed through clean engine technology
- Environmentally friendly manufacturing, maintenance, and disposal of aircraft.

He noted that fuel efficiency improved sharply in the 1960s and '70s due to the adoption of high bypass turbofans, but the rate of improvement has gone asymptotic in the more recent years. In terms of technical solutions, some of these goals conflict with each other. For example, some methods to reduce CO_2 production will cause penalties in fuel efficiency.

The second Strategic Research Agenda (SRA2) is now being established for integration and implementation of SRA1, this is planned to be completed in June 2004.

Contributors to noise include the aircraft, flaps, landing gear. The goal for the engine is a 6% reduction in noise.

Several European programs are being worked to support these objectives:

- SILENCER – SNECMA lead. Test new devices for noise reduction including increased bypass ratio.
- POA (Power Optimized Aircraft) – led by Airbus
- EEFAE
  - ANTLE – led by Rolls Royce, aimed at short-term improvements
  - CLEAN – longer term improvements
- VITAL – breakthrough technologies, part of FP6. Aimed at improve propulsive efficiency by addressing modes of energy loss.
- NEWAC – aimed at improved thermal efficiency, in part through use of heat exchangers.

In response to questions at this point:

- Civil and military engine programs are handled separately.
- With regard to alternate fuels, they are looking at hydrogen. It is believed that wide use of hydrogen as a fuel will begin in the auto industry, then transition to aeronautics.

Presentation by R. Bengelink
Viewfoils from the presentation are included as REF5

Ron Bengelink (Boeing, retired) then presented material prepared by the US Federal Aviation Administration in the US.

Noise limits aircraft system capacity. For emissions, one challenge is to understand the related science. It is important to start looking at interrelationships in the arena of noise and emissions. NASA is focused on source control and abatement, while the FAA is directed toward abatement, land use, and operational procedures.

The FAA is trying to address these issues at the system level, rather than through the traditional stovepipes. A new Center has been established to focus on noise and emissions in part through a university consortium. The international community can participate in this project. The top goals are to reduce the number of people who are exposed to significant noise, and to reduce the fuel burn per plane-mile.

Questions posed for the international community:

- What common goals can be established for the US and Europe?
- What other metrics should be used – for example, how does complexity affect societal impact? Are there other examples where this has been done?
- Impact of fleet mix on these environmental issues?

A question asked of this presenter was: The emphasis in this presentation is on the ground (near the airport). Is there an airborne activity? In response, the speaker made the following points:

- The FAA doesn't see global warming as being withing their scope, right now.
- The focus of the FAA is to reduce the number of people who are affected by noise.
- The FAA is a regulatory agency, hence it has a near-term focus. NASA is working the longer-term technology issues.

Presentation by J. Green
Viewfoils from the presentation are included as REF 6 and REF7

The third speaker was John Green, who presented a summary of a recent study by the Royal Aeronautical Society "Greener by Design". He assured us that no pun was intended between his name and the title of the study. This study had three component subgroups: operations, technology, and market-based options.

The view in Europe is, environmental issues will limit the growth of civil aviation. The UK Treasury has set the costs of aviation-produced greenhouse gases on the climate at £1.4B per year. The speaker commented, this could be seen as setting the basis for a special tax on aviation. Political will is building for a "carbon tax". However, one of the speaker's main points was that, contrary to common belief, CO_2 is only one portion of the problem – one-third to one-half of the total aviation contribution to climate change. However, CO_2 has a long lifetime in the stratosphere (50-100 years) while other contributors are much shorter-lived.

Noise is being addressed through engine technology, engine design, airframe technology, operations, noise regulations, and land management. With regard to engine design, the airlines have accepted an A380 fuel burn penalty of 1-2% to meet night noise requirements at Heathrow.

With regard to local air quality, improvements will come through combustor technology, engine design, and the phase-out of dirtier types. There is a conflict between reduced fuel burn and reduced NO_X emissions.

The major contributors to aviation impact on the climate are: CO_2, NO_X, and contrails which dissipate into cirrus clouds. These can be addressed through reduced drag, reduced weight, and increased propulsive efficiency. The speaker noted that long-range aircraft are inherently less fuel efficient than medium-range aircraft, thus one improvement would be to make long trips through two or three shorter hops. Another benefit would be to reduce cruise Mach number, to select cruise altitudes to avoid contrail formation (by avoiding regions of cold moist air), to keep emissions out of the stratosphere, and through advanced propellers. Other improvements will come through low NO_X combustors, though the engineering issues force one, to a degree, to trade CO_2 reduction for NO_X reduction. Significant improvements could be obtained through flight path management – keep out of cold moist air, keep out of the stratosphere, but we probably do not have adequate understanding of the atmosphere to make this practical today.

An overarching question: is today's atmospheric science sound enough to use as a basis in setting policy?

General Questions

All of the questions were directed to John Green.

FIRST QUESTION - Environmental impact can be mitigated by reduced Mach number and reduced range. This is of course opposed by the drive to high speed. The impact of speed on environmental impact is generally accepted. The terms in the range equation include L/D ratio, propulsive efficiency, and structural weight. Long range aircraft suffer through both lower efficiency, and through a lower ratio of payload to structural weight (ratio is three for medium range aircraft, two for long range aircraft). This observation of the relationship between long range aircraft and the environment is not popular among countries where there is a tourist industry based on people coming from a great distance. One non-traditional mitigation based on this observation might be to adopt air-to-air refuelling of civil aircraft.

Another mitigation will be the progressive retirement of older, dirtier, noisier aircraft. This is driven by ICAO regulations. The speaker noted, the average age of European aircraft is eight years, but the life of a modern aircraft is thirty years. So, the older (dirtier, noisier) aircraft don't go away when they disappear from the European carriers, they go somewhere else in the world. Due to the relative newness of aircraft in European service, there is some belief that a fuel tax would not have a beneficial impact on the environment; they are already operating fairly new aircraft.

SECOND QUESTION – Heathrow noise regulations lead to higher fuel consumption as noted during the presentation. Thus, improvements to the local environment (Heathrow noise) can be in opposition to improving the global environment. Another observation: it is not necessary to have an international agreement through ICAO, for regulations to have a global impact, since all manufacturers will ensure their aircraft are compatible with Heathrow operating regulations. Thus, European regulators may set requirements that will be followed globally, but not approved by ICAO.

The political discussion at present is totally in terms of CO_2; regulators need to be sensitive to the complexity of the problem, and the importance of NO_X and contrails in the overall discussion. The speaker concluded his response with the observation that there are clearly different views between the US and Europe on climate change issues.

THIRD QUESTION – Does this mean hydrogen is not a good idea due to total system issues?

The speaker responded by noting first that the interface between the troposphere and the stratosphere is highly variable. Contrails are more of a problem in stratospheric flight, but NO_X is less of a problem. One regulatory approach might be to ban stratospheric flight, and also to avoid flight through cold damp air. This would lead to lower altitudes, and thus rougher flight. Or, if significant gains are achieved in lower NO_X combustors, then stratospheric flight could become very desirable. It looks like avoiding contrails will be the top priority in the future, this is only an issue for stratospheric flight.

FOURTH QUESTION – Any remedy depends on incentives, which come from the government. Motives of government are usually short range and transitory. Why do you think this will help?

One study suggests shifting to ground transport. However, this seems impractical at present because the required infrastructure doesn't exist. The Greener by Design team is trying to point out the multiple facets of the problem. Incentives will come. However, most of the constituent input to politicians is based on noise, hence noise is the highest priority.

FIFTH QUESTION – The B-2 avoids contrails by adjusting altitude. This leads to Air Traffic Management problems.

This is feasible, it can be done. Atmospheric science is not good enough to guide this process today, but it is improving fast. The Greener by Design study was focused on being sure the aviation community understands the issues.

SIXTH QUESTION – What are the market issues for many legs with short-range aircraft? We need incentives on the manufacturer to address noise and emissions.

Breakthrough changes will occur only with incentives for change. The role of the scientific community is to understand all the issues. Incentives for change will come from the regulators; they need to understand the facts of the situation.

4. Summary Panel 2 – Safety and Security

[Moderator: Wolfgang Schmidt Rapporteur: Murray Scott]

Presentation by T.K. Huynh (TH)
Viewfoils from the presentation are included as REF 8.

TH provided background to the European Strategic Research Agenda (SRA) for Aeronautics and the work of the Advisory Council for Aeronautics Research in Europe (ACARE). There is a 35 person team of research, industry and air traffic control personnel addressing the goals to be achieved by 2020. A key issue is that, by that year, industry has to achieve safe, secure, on-time, all weather operations, with three times the volume of traffic – 24 hours per day, seven days per week. The safety objective requires an 80% reduction in the accident rate and the security objective is to ensure there are no successful hijacks. The SRA focus is on breakthrough technologies and systems, human factors, and certification and regulation. There appear to be no technology inhibitors to developing the necessary affordable, automatic and certifiable aids. The implementation of a global systematic approach, addressing social factors and supported by public authorities, is recognised as the major challenge.

Discussion:
Triantafillos Tsitinidis raised the issue of whether control could ever be completely taken from the cockpit. TH stated that it is technically possible; if it is assumed that a hijack may occur about every five years, then an automatic return to the airfield should be possible. Luis Campos questioned whether the current Traffic Collision Avoidance System (TCAS) is sufficient to avoid collisions. TH stated his personal view is that new devices need to be developed. Automatic Dependence Surveillance (ADS) and broadcast systems will assist in dealing with dense traffic situations.

Presentation by Dimitri Mavris (DM)
Viewfoils from the presentation are included as REF 2 (Viewfoils no 28-33)

DM discussed the aviation security and safety issues addressed in the United States (US) National Aeronautics and Space Administration (NASA) Aeronautics Blueprint; these are aircraft hardening, flight procedures and monitoring, surveillance and intervention, and information technology. The initial objectives need to be aircraft system protection, safe flight intervention, and protection of the public.

Discussion:
Jerry Hefner clarified the NASA position on aviation security and safety stating that they are now major priorities for the whole organisation and not just in the Vehicle Systems area. In response to a question from Detlef Müller-Wiesner concerning dual use programs at NASA in this area, he advised that the situation is changing and that the military would have to fund such activities in the future.

Presentation by Wolfgang Schmidt (WS)
Viewfoils from the presentation are included as REF 9.

WS provided an overview of the proposed European EUR 60 million research and technology program on security called “For a Secure Europe in a Better World”. Many of the objectives are similar to those of existing or planned US programs, so it is anticipated that a link with US activities in this area would be established.

Discussion:
In response to a question from Anders Gustafsson about the funding situation for the proposed European program, WS advised that the first call for projects would be in 2004 and EUR 15 million is expected to be allocated from July 2004. Nina Voevodenko raised the issue of common standards, however WS stated that there are none as yet; he suggested that the International Civil Aviation Organisation (ICAO) may be the appropriate body for this, although there are military considerations. Thomas Roos asked about the

proposed work on smart underwater systems and WS explained that these would be a preventative measure using special vehicles to achieve secure harbours.

General Discussion
3:15 – 3:40 pm

Gennady Amiryants provided an overview of the Russian active aeroelastic wing concept for safety that commenced in the 1960s, and has been presented to various international organisations (REF 10).

Fred Abbink questioned whether it was realistic to aim for an improvement by a factor of five in safety statistics. T.K. Huynh stated that the three major causes of accidents were being addressed, but perhaps availability of funding may limit progress. As an example, crashes during approach and landing should progressively be reduced through the introduction of more automatic systems. Dimitri Mavris stated that revolutionary technologies would be required to achieve “stretch goals”.

Luis Campos raised the issue of unauthorised access to ground facilities and Jerry Hefner stated that this was an operational problem and not a technology issue. T.K. Huynh commented that it was a budget issue also to prevent the blackmail of authorised personnel. Jerry Hefner advised that NASA was not the only agency looking at security issues and that ideas were being sought from everywhere.

Wolfgang Schmidt commented that the focus should be on realistic scenarios to be addressed immediately. Jerry Hefner stated that a new proactive approach was required, as the current arrangements make it difficult to respond. Bruno Stoufflet suggested that the transition between old and new systems may be a problem. Dimitri Mavris commented that NASA developed concepts to a Technology Readiness Level (TRL) of 3 to 6 (on a scale of 1 to 9), whereas industry had to implement the new technology to a TRL of 9. Jerry Hefner expanded on this by explaining that NASA does not implement new technologies – it was up to companies to do this.

T.K. Huynh stated that economics is a major issue; for example, all aircraft entering US airspace must have TCAS. Dimitri Mavris commented that researchers do simulations to determine which systems should be implemented and this should include consideration of all factors.

5. Summary Panel 3 – ATM-issues

[Moderator: Ron Bengelink Rapporteur: Christiane Michaut]

Presentation by Jan van Doorn, EUROCONTROL
Viewfoils from the presentation are included as REF 11.

In Europe, air traffic has doubled in the last 13 years and reaches 8.5 millions flights per year, up to 28000 on the busiest days. In the Vision 2020 report the challenges for the Air Transport System are set :
- 3 times growth in aircraft and passenger movements from 2000;
- 99% of flights within 15 minutes of the timetable in all weather conditions;
- time spent in airports : 15 minutes for short-haul flights up to 30 for long-haul flights;
- a seamless European Air Traffic Management (ATM) system;
- a competitive European industry.

To reach the "age of sustainable growth" and these high level goals, ACARE SRA has further designed R&T paths or contributors to the goals :

- optimise the use of existing airspace capacity with the ability to take the system from end to end, to perform 4D flight trajectories and to offer a reliable System- Wide Information Management System (SWIM) which enables Collaboration Decision Making (CDM) to all the stakeholders (aircraft, airlines, airports and ATM service providers) on the actual air traffic execution;

- remove the airspace capacity barrier with new operational concepts taking the best advantage of automation to support the human in the management of the system;

- maximise the current airport performance with standard all weather operations, simultaneous operations on dependent runways, reduced separation minima in an safe way; and looking for a more global transportation system, to incorporate new/non conventional type of traffic, to explore new airport networks and even intermodality (rail transportation,…);

- minimise the aircraft turn-around time and ensure efficient and secure displacements and controls for passengers and goods in **the airport of the future** ;

- create **a seamless global European ATM system** based on a global interoperability for the system, the operators/managers as required by the airlines.

To improve the system efficiency, capacity and the environment are key elements but enhanced **safety** is fundamental. Enhancing current system is not sufficient, new ATM paradigms, revolutionary concepts and breakthrough technologies embedded in a total system approach are mandatory to answer the challenges. A critical element is the transition from today's system.

Co-operation of all stakeholders on the R&T for the future Air Transport System is necessary.

In Europe, the European Commission Single European Sky initiative and ACARE will contribute to the reshaping of research. In the future the European Commission and EUROCONTROL will combine their views on programmes to improve productivity.
There is a need for a single "architect" having a long term vision development of the ATM system embedded in the Air Transport System, establishing links between European developments and US and other parts of the world ones, working hand in hand to facilitate a true global ATM system in the future.

Presentation by Jerry Hefner
Viewfoils from the presentation are included as REF 2 (Viewfoils no 18-22)

Jerry Hefner presented corresponding US views (Chapter 2.4 REF 2) as basis for the discussion referred below.

Questions and comments arising from the presentations:

1) US views of the future airspace utilisation

The future airspace centered vehicle will be leading research in the future. The classical disciplines as aerodynamics, structures, materials,… will not be in the front part, but we have to look more in systems of systems.
We have to simulate the future airspace now. It is performed in the Airspace system programme looking at capacity and mobility (freedom) as for example the US SATS programme concerning point to point general aviation operations (fractional ownership, air taxi,…). This is leading to the apparition of new airframe manufacturers (microbizjet,…). The value of time is still very important and people want to have the choice of the shortest point to point trips.
The challenges are :
- precise and reliable forecast of the weather to reduce disruption in en-route traffic (complete digital knowledge of the en-route atmosphere, wake-vortex knowledge,…) and eliminate delays;
- traffic optimisation to eliminate the air traffic domino effect, the geographic holding points, to limit airspace/sector flexibility, to increase airline flexibility to manage contingencies, to minimise congestion in complex traffic situations.
- high flow airports to eliminate gaps in arrival/departure streams, increase of the operations in bad weather, to enable rapid reconfiguration, to integrate short-haul aircraft into aircraft operations (need of new airport design and operational models), to exploit 5000 under-utilised public airports (smart non towered airports with self separation areas, provide sequencing information and scheduling, need of ADS-B and glass cockpit in IMC conditions).

2) Timing of the implementation of the infrastructure

The technologies are available, within 4 or 5 years some implementations may be seen if financing is available. The next step will take more time and the need of a push by industry is mandatory.
There is also a need of new training for operators which will take into account the human factor aspect. Procedures have to follow the ICAO recommendations. But the ICAO process is also slow and therefore inconsistent with the demand of society. How to make improvements to accelerate the process? The only way seems to go to the highest level in government.
The main purpose is at the end to have a safe affordable system and each country to have their own internal security about the sharing of the airspace.

3) Little technological push and no economic pull

The main problem is that nobody owns ATM because it does not generate money, it only generates delays, so that no one is taking decision. Political persons are more interested by noise concerns because complaining airport neighbours are potential voters. Only when the system comes to a gridlock again, the public will no longer tolerate the situation, then and only then it will become a political issue.
Concerning the link between ATM and environmental impact, ATM can mitigate this impact by changing its way of operation.
In our today's world, focus is on short term profitability. The scientific focus on ATM is insufficient and cross fertilisation with R&T developed elsewhere is little.
But air transport is important for the world economy and ATM is therefore an important contributor.

We have to show that supporting the development of a healthy air transport system generates economic growth and jobs. With the present statistics, it seems up to now difficult to conclude that more traffic is directly connected to economic growth. In order to raise the political awareness on air transport, more lobbying is maybe required. The more because only 5% of the yearly aeronautical research budget is devoted to ATM research, while this will be the most limiting factor for air transport growth, together with the airports..

4) A dream to see systems clusters or satellite dedicated to security/ safety/ATM?

From a researcher point of view it is possible with the GPS system, but in the US, FAA thinks of the need of a ground based system as backup for navigation and or aircraft communication.

In Europe the ideas are that GPS plus Galileo (which will be pushed forward) as independent systems could be the sole means in the future. However, although having the highest level of requirements, the air transport sector can only bear a small amount of the cost of such a Galileo-system. On short notice the terrestrial systems will remain in use, so aircraft are carrying a multitude if navigation systems on board. A first return on investment in satellite navigation will come from the possibility to reduce the oceanic separations, where capacity becomes an issue

5) Long term research need and investment

Weakness in research is a reality for example in new mathematical tools and models development for ATM. There is a strong need for long term research. A better use of the budget of EUROCONTROL and EC will be pursued, programmes will come in line.

However, the idea of EUROCONTROL to put more emphasis on research, especially in innovative research, is at this moment underscored by the airlines who are in bad financial status and want to cut air navigation service charges and thus EUROCONTROL funding. Most ATM Service Providers are now cooperatised and cannot ask for more money from their governments but have to recoup their costs including future investments through these charges. So the available room for enhancements is at the moment rather small. So part of the research money should come from the tax-payer. The EC sponsored Frame-Work Programmes belong to this category.

In Europe, EUROCONTROL is aiming for the leadership. Industry and airlines are pushing the EC to take leadership and put an end to the fragmentation in Europe and to support system development towards a more unified system, mandating EUROCONTROL to be their executive arm. We know that working together with a same goal is the way to perform better, for example with the Airbus/Thalès/EADS (Air Traffic Alliance) and with Boeing.

In **conclusion** the discussion was interesting and we need to have in mind that other areas are affected like homeland security and the transformation of national defence systems into a European one.
The first objectives in this field are to better identify customers, to find important drivers to promote a jump in ATM research and need for leadership in ATM.

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APPENDIX A

May 2003

Personal Invitation
Workshop

"Towards a Global Vision for Aeronautics"
Sorrento, Italy - October 6, 2003

During the last few years a number of visionary and strategic documents on the future of aeronautics have been developed world-wide. What they all have in common is a focus on societal needs and some key challenges for aeronautics to meet those needs.

The ICAS Programme Committee, comprising over 50 representatives from the world-wide aeronautical community, will held a planning meeting early October 2003 in Sorrento Italy for the ICAS 2004 congress in Japan. Taking advantage of the gathering of this unique group of experienced people we have decided to arrange a one-day workshop on the above theme.

The workshop will include overview presentations by selected US and European speakers on recent documents such as:

- US "Blue Ribbon" report , NASA Aeronautics Blueprint, Aeronautics Architect
- European Vision 2020, ACARE Strategic Research Agenda

We are hoping to have speakers also from other parts of the world (Russia, Japan….)

The speakers will be asked to focus on "key aviation challenges" like safety & security, environmental goals, ATM-issues. These are issues for which a global vision should be very useful.

The idea is to have discussions and dialogues involving all participants. This will be achieved through question sessions after each presentation plus thematic panel discussions around key topics including interaction with the audience.

It is our intention and hope that this workshop will come up with creative ideas regarding a global vision for these key challenges. We plan to make the presentations with main conclusions from this event available.

It is our pleasure to invite you to take part in this special event. Please confirm yours attendance and willingness to contribute before August to the ICAS Secretariat on the address above.

The venue for this event will be Hilton Sorrento Palace (www.hilton.com). Accommodation can be booked directly with the hotel using the attached form.

With best regards

Billy Fredriksson
ICAS President

Jerry Hefner
Chairman Programme Committee

APPENDIX B

ICAS Sorrento Workshop October 6, 2003 - List of Participants

Name	**Company**	**Country**Abbink,
Fred Prof. Ir.	NLR	Netherlands
Amiryants, Gennady A. Prof.	TsAGI	Russia
Azevedo, Joáo Luiz F.	CTA/IAE/ASE-N	Brazil
Bengelink, Ronald L.	Boeing	USA
Benzakein, Mike J. Dr.	General Electric Aircraft Engines	USA
Bil, Cees Dr.	RMIT	Australia
de Boer, Andre Prof. Dr.	University Twente	Netherlands
Campos, Luis M.B.C. Prof.	Instituto Superior Técnico	Portugal
Carlomagno, Giovanni Prof.	Università di Napoli	Italy
Cosner, Raymond R. Dr.	Boeing	USA
van Doorn, Jan	Eurocontrol / ACARE WT4 Rapporteur	France
Djojodihardjo, Harijono Prof.	Institute of Technology Bandung	Indonesia
Filatyev, Alexandre S. Dr.	TsAGI	Russia
Fredriksson, Billy Prof.	Saab AB	Sweden
Galasso, Attilio	SICAMB SpA	Italy
Golia, Carmine Prof.	Seconda Università di Napoli	Italy
Goraj, Zdobyslaw Prof.	Warsaw University of Technology	Poland
Green, John E. Dr.	ARA	UK
Gustafsson, Anders	FOI	Sweden
Hefner, Jerry N.	NASA	USA
Huynh, T K	Thales / ACARE WT3 Rapporteur	France
Iaselloo, Angelo	AIAA	USA
Klement, Josef Prof.	Brno University of Technology	Czech Republic
Kobayakawa, Shinya	Mitsubishi Heavy Ind (ret)	Japan
Laschka, Boris Prof. Dr. Eng.	Technische Universität München	Germany
Lowrie, Brian Dr.	Rolls-Royce (ret)	UK
Mari, Christian Dr.-Ing.	Snecma Moteurs / ACARE WT2 Chair	France
Mavris, Dimitri Prof.	Georgia Institute of Technology	USA
Michaut, Christiane Mrs	ONERA	France
Mondon, Jean-Yves	EADS	France
Mulero, Manuel	INTA	Spain
Müller-Wiesner, Detlef Dr.-Ing.	EADS	France
Onorato, Michele Prof.	Politecnico di Torino	Italy
Persiani, Franco Prof.	Università di Bologna	Italy
Poll, Ian Prof.	Cranfield College of Aeronautics	UK
Rand, Omri Prof.	Israel Institute of Technology	Israel
Rohàcs, József Prof. Dr.	Budapest University of Technology	Hungary
Roos, Thomas	CSIR, Defence Aeronautics	South Africa
Scheit, Megan	AIAA	USA
Schmidt, Wolfgang Dr. Ing.	DaimlerChrysler AG	Germany
Schmitt, Dieter Prof.	Airbus/ACARE WT1 chair	France
Scott, Murray L. Prof.	Research Centre Advanced Composite Structures	Australia
Smrcek, Ladislav Dr.	University of Glasgow	UK
Stoufflet, Bruno Mr	Dassault Aviation	France
Stratton, Aubrey L. Mr.	Lockheed Martin Aeronautics	USA
Suzuki, Shinji Prof.	University of Tokyo	Japan
Tsitinidis, Triantafillos Dr.	Hellenic Aerospace Industry	Greece
Ueda, Tetsuhiko Dr.	National Aerospace Laboratory	Japan
Voevodenko, Nina V. Dr.	TsAGI	Russia
Wallace, William Dr.	National Research Council	Canada

APPENDIX C

REFERENCES/PRESENTATIONS

REF1: Overview presentation ACARE SRA – D. Schmitt
REF2: Overview presentation NASA Aeronautics Blueprint - J. Hefner
REF3: Japan: Aircraft Industry and Aeronautical Research Plan – S. Suzuki
REF4: The Next 20 Years - The Challenge of Environment in Europe (ACARE WT2) – C. Mari
REF5: NASA/FAA Environment R&D Activities – R. Bengelink
REF6: Greener by Design – J. Green
REF7: Reducing Impact – J. Green
REF8: Safety & Security (ACARE WT3) – T.K. Huynh
REF9: Security R&T – For a secure Europe in a better world – W. Schmidt
REF10: Concept and Flight Safety in View of Advanced Airplane Designs – G. Amiryants
REF11: The Challenge: Air Transport System Efficiency (ACARE WT4) – J. van Doorn

All presentations are available on a CD-Rom.