



# The representation of the interests of the space community within



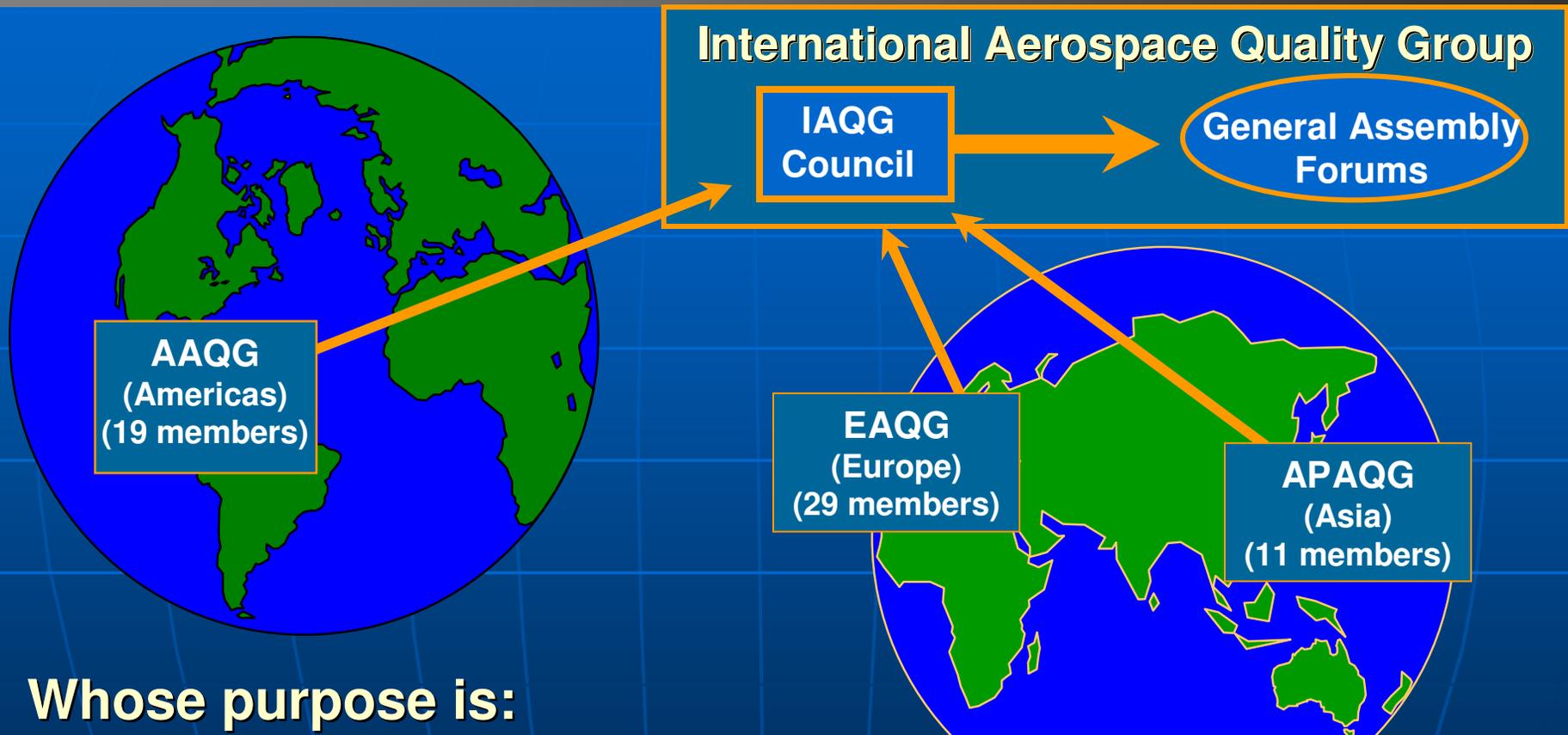
Presented at TRISMAC 2008  
15 April 2008, ESTEC, The Netherlands

By  
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European Space Agency

# Roadmap

- 1. IAQG and its results**
- 2. Impacts of IAQG initiatives on space community**
- 3. Representation of space within IAQG**
- 4. Strategy and priorities of the IAQG Space Forum**
- 5. Conclusions**

# A Global Team



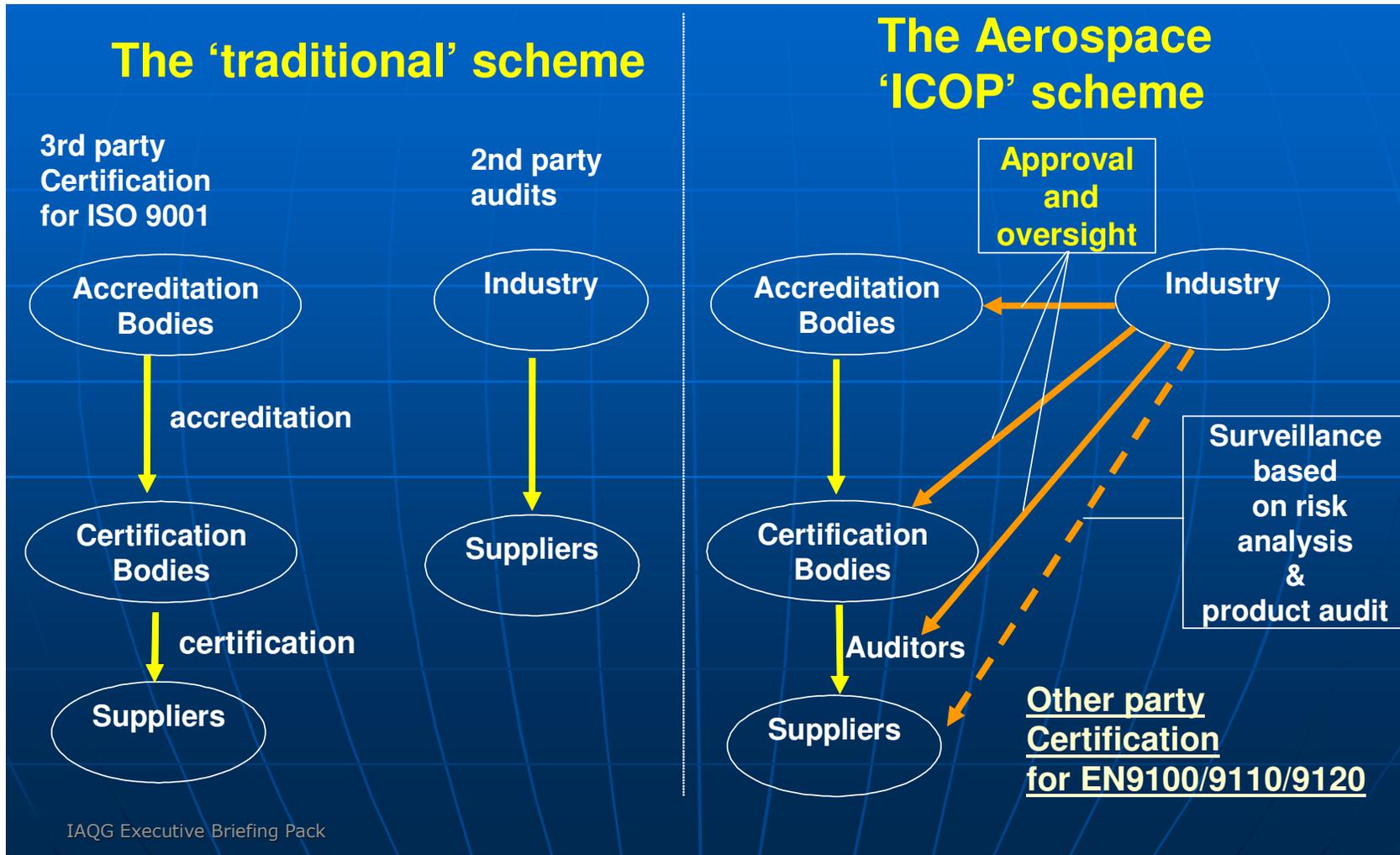
**Whose purpose is:**

**Implement initiatives that make significant improvements in Quality and reductions in cost throughout the value stream by establishing and maintaining dynamic cooperation, based on trust, between international aerospace and defence companies**

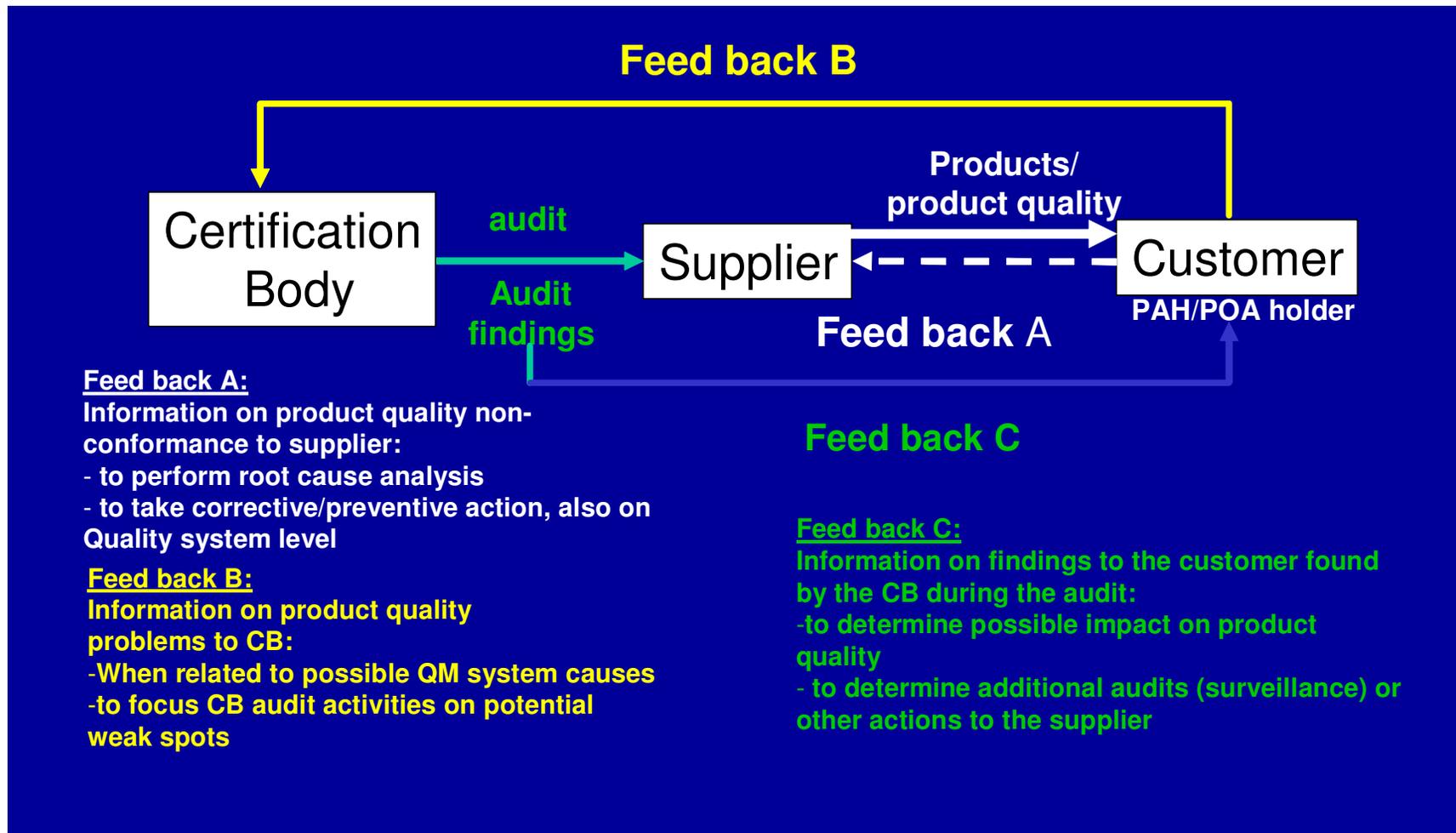
## 9100: International Aerospace Quality Standard

- **Foundation of IAQG achievements**
- **Harmonised quality requirements for use throughout the global aerospace supply chain**
- **Developed and maintained by IAQG, but published by a variety of standardization bodies with different designations**
  - e.g. AS by SAE, JIS Q by SJAC, EN by ASD-STAN
- **First release in 1999** [Note: IAQG launched in 1998!]
- **Currently under revision**
  - Scope: from “Aerospace” to “**Aviation, Space and Defense**”
  - Major changes (unlike ISO 9001:2008, limited to clarifications)
  - Release in 2009

# Industry Controlled Other Party (ICOP) Scheme



# ICOP scheme feedback loops



IAQG OASIS - hans

https://shop.sae.org/servlets/index?PORTAL\_CODE=IAQG

International Aerospace Quality Group  
Online Aerospace Supplier Information System

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**Data Search**  
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IAQG Member Companies  
National Aerospace Industry Associations (NAIA)  
National Accreditation Bodies (NAB)  
Certification/Registration Bodies (CRB)  
Aerospace Experience Auditors  
Certified Suppliers

**Hello Hans Luijt**

Welcome to International Aerospace Quality Group - Online Aerospace Supplier Information System (IAQG-OASIS).

If you are working in the aerospace industry, involved in aerospace supplier selection and surveillance, this is your reliable source for aerospace supplier certification and registration data.

This online resource contains a list of suppliers who are certified / registered under the IAQG rules to be in compliance with the aerospace quality management system requirements (9100 series). This resource also contains all bodies involved in the process (i.e. National Accreditation Bodies, Certification/Registration bodies and Authenticated Aerospace Experienced Auditors).

Use the navigation menu on the left. Personal information can be seen or modified using the menu on top.

The IAQG OASIS database was launched on July 1, 2003.

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**Online Aerospace Supplier Information System (OASIS)**

**National Accreditation Bodies (NAB)**  
**Certification/Registration Bodies (CRB)**  
**Aerospace Experience Auditors**  
**Certified Suppliers**

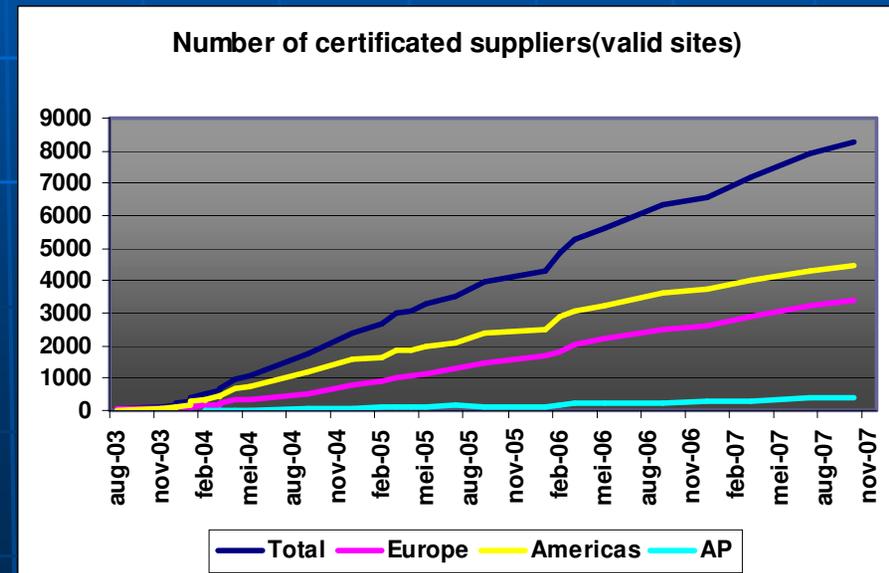
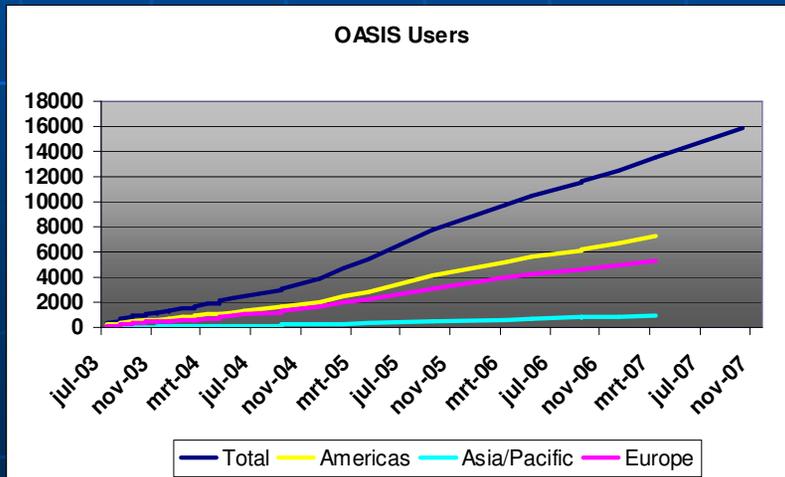
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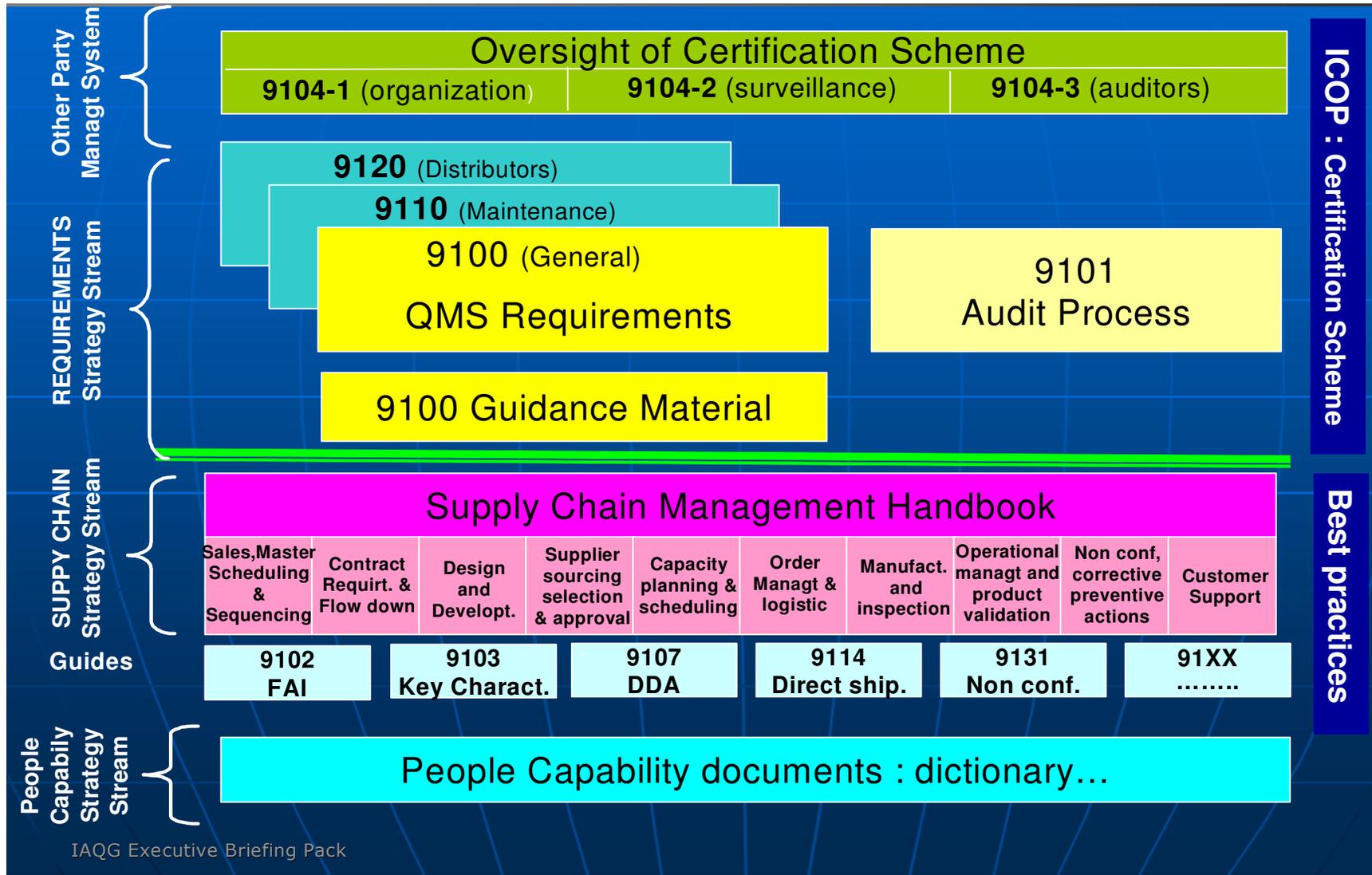
## Status Early October 2007 (Mid-March 2007):

- 15926 (13556) users
- 696 (668) registered Aerospace Auditors
- 95 (83) approved CRB's
- 8252 (7165) certified supplier sites:
  - 4476 (3987) in Americas
  - 3380 (2868) in Europe
  - 396 (310) in Asia/Pacific

Source: OASIS



# Overview of IAQG Documents





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## Americas

- **Overall space standardization landscape**
  - The level of US based space industry standardization is “minimal” [1]
  - Many NASA standards, also widely known and used internationally
- **Impact of IAQG initiatives**
  - *“DoD and NASA are some of the biggest users of the suite of IAQG quality standards”* [1]

### **NASA Quality Assurance Program Policy NPD 8730.5**

Quality System Requirements for Organizations Responsible for Performance of Work

**a. Work that is both critical and complex shall be performed in accordance with the quality system requirements of AS9100.**



- AS9100 extensively used internally and flowed down to suppliers
- ICOP certification scheme widely applied

[1] The Future of Aerospace Standardization, by Aerospace Industries Association of America, January 2005

## Asia Pacific

- **Overall space standardization landscape**



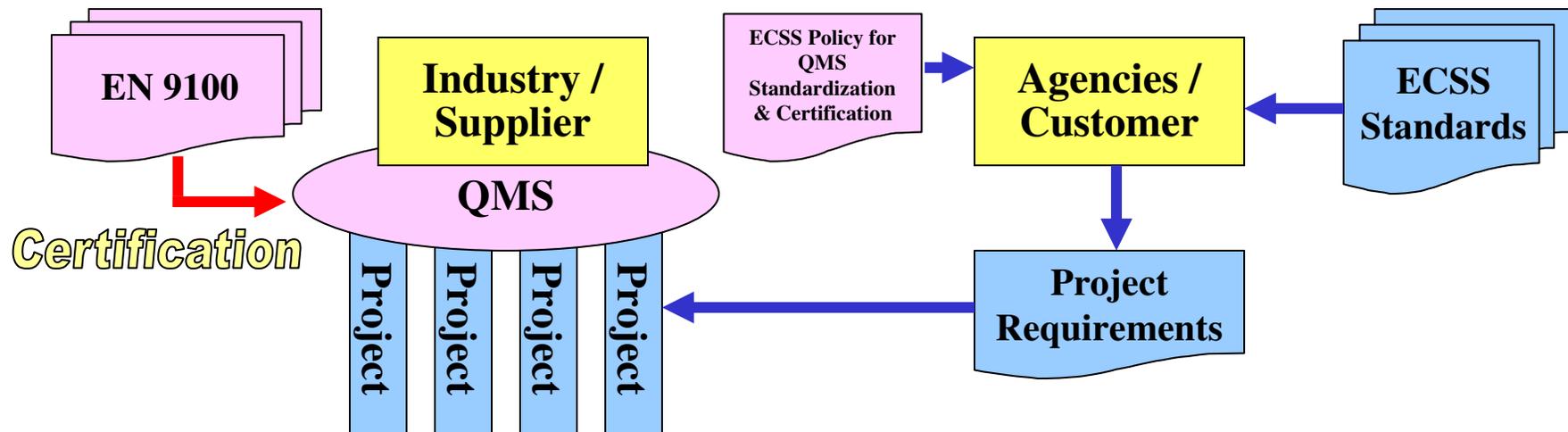
- JAXA, ISRO standards
- Space Standards from China Astronautic Standardization Institute (CASI), covering quality, product and engineering

- **Impact of IAQG initiatives**

- JAXA is planning to apply the 9100:2009 standard to its suppliers
- Space industries also planning application and flow down of 9100
  - JIS Q 9100 deployed to suppliers for H2A procurement
- Focus on establishing guidelines for 9100 application
- Most of major space companies in Japan are certified (12 to date)
- Number of certified companies and growth rate lower than in the other two sectors, but expected to grow faster after deployment by JAXA and primes

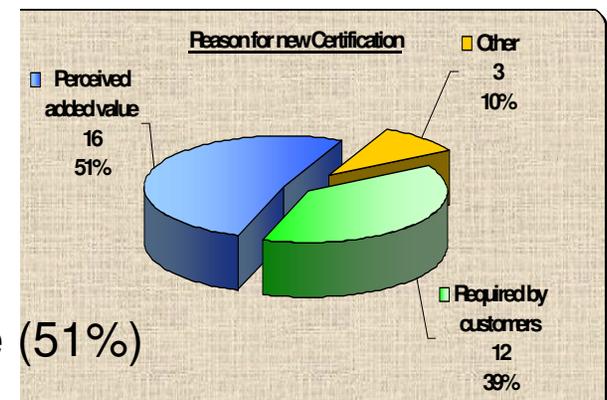
# Europe (1/2)

- **Overall space standardization landscape**
  - ECSS includes Space Agencies and industry
  - ECSS has developed a complete set of standards, covering project management, product assurance and engineering
  - ECSS standards are systematically used in contracts for European space activities
  - ECSS and IAQG activities are complementary



## Europe (2/2)

- **Impact of IAQG initiatives**
  - ECSS EN9100 Policy (under review) encourages its application, but leaves the decision to each organization
    - EN 9100 recognised by ECSS as a suitable QMS standard
    - space organisations encouraged to get certification to EN 9100
    - customers should recognise EN 9100 certification
  - EN9100 generally not required by European customers (space agencies, primes), but often required by US customers
  - EN 9100 certification survey: main results
    - 63% of respondents are certified
    - increase to about 80% in the medium term
    - main motive was the perceived added value (51%)





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**IAQG has a growing impact on Space,  
but how is Space represented within IAQG?**

## IAQG Strategy Streams



## Milestones of IAQG outreach to Space

- **1999: first release of 9100 → inputs from Space were requested at the last minute and were all rejected**
- **2002: ISO TC20/SC14 complained that space had been totally neglected for the supposed ‘Aerospace’ Quality standard**
- **2002 Oct – IAQG meeting in Torino: representatives from space agencies and industry were invited to discuss how to cooperate**
- **2003 Apr: IAQG Space Forum established at IAQG meeting in Edinburgh**
- **2003 – 2004: 9100 was reissued. What about space comments?**
  - Only space comments not adding new requirements were accepted
  - Finally, 9100 revision limited to deletion of section based on ISO 9001:1994
  - End result: no space comments implemented (neither from other sources)

## IAQG Space Forum: Current Membership

### AAQG

- Larry Patzman (LMCO) [L]
- Andrea Reilly (NGC)
- Brian Hughitt (NASA)
- Buck Crenshaw (NASA)
- Jackie Cozza (Boeing)
- Stan Graves (ATK)
- Stan Purwin (IHU APL)
- David Hall (MDA)
- Kevin Beard (NQA-USA)
- Donna Herring (USA)
- Debra Harrison (DCMA)

### APAQG

- Kikuchi Satoshi (NT Space) [L]
- Satoshi Owaki (MHI)
- Yukio Hyodo, Hiroaki Takeuchi (JAXA)
- Toshihiro Yoshihara (IHI)
- Yuanying Jiang (CASI)
- Zhapjun Yang (CASC)

### EAQG

- Roberto Ciaschi (ESA) [L] (facilitator)
- Andreas Jain (DLR)
- Heribert Knoglinger, Ian Dummigan (Astrium Sat)
- Andre La Croix (Astrium-ST)
- Jean-Marc Pausse (TAS)
- J-M Gonzalez-Estevez (EADS-CASA)
- Jacob Haham (IAI)

## IAQG Space Forum has stimulated coordination within each sector

- **AAQG Space Forum**

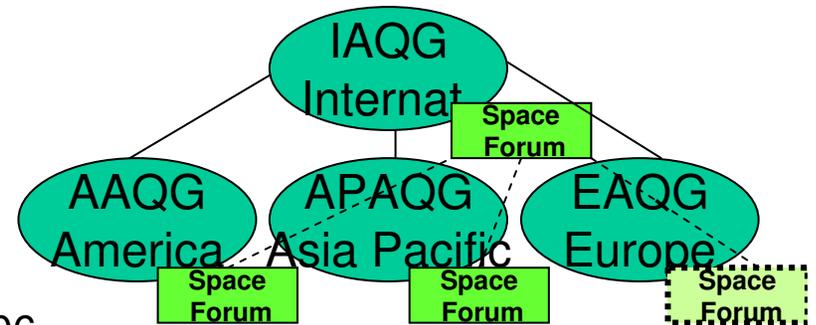
- Created in 2005
- Very active and well connected to AAQG

- **APAQG Space Forum**

- JAQG Space Forum created in Spring 2006
- Very complex sector: evolving to full APAQG Space Forum, with meetings with representatives from China and South Korea so far

- **EAQG Space Forum**

- Since 2003, space representation was solely through ECSS, with the ECSS International Aerospace Quality Liaison (IAQL) WG
- ‘Embryonic’ EAQG Space Forum started in spring 2007 with additional representatives from EAQG
- ECSS is reviewing all external cooperations, including EAQG/IAQG. Possible outcomes
  - Formal MoU, with EAQG SF co-appointed by ECSS and EAQG, or
  - EAQG Space Forum within EAQG, with ‘soft’ or no liaison with ECSS



## Involvement in initiatives and bodies

- **Participation in specific initiatives**
  - 9100 team: strong American and European space presence
    - Good influence and results
  - ICOP / Other Party Management Team (OPMT): 2 US presence
    - Good AAQG influence, just starting at level of IAQG SF
  - Other initiatives: some Individual participation, but no cohesive action
    - Limited influence
- **Influence in IAQG Council**
  - Space Forum reports to Council meetings
  - No voting member with predominant space focus



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# IAQG Space Forum - Strategy

A global forum for space quality issues –  
Space perspective across IAQG initiatives



## Current State

1. 9100 not optimised for full range of aerospace activities. No application guidance for space existing.
2. No active involvement in pursuing space interests in 9100 certification scheme.
3. No certification of critical space processes against established process specification.
4. IAQG labels all its standards as aerospace, but their applicability to space is not always properly assessed.
5. Exchange of experience across regions rather limited.

## Ideas on How to Proceed

1. A) Support & influence the revision of 9100, B) develop guidance material for 9100 application to space, C) Encourage deployment through the supply chain
2. Ensure suitability of ICOP scheme for the space supply chain, by participating in:
  - Oversight of the scheme and provision / processing of space customers' feedback;
  - Identification of common QMS causes of product quality deficiencies.
  - Definition of competence and training requirements of space auditors
  - Definition of training / familiarization modules on space specific topics.
3. Develop a business case for the application of 3<sup>rd</sup> party certification to critical space processes. Future actions TBD accordingly.
4. Monitor IAQG and other related initiatives with respect to common space interests, to support & influence relevant ones, or limit the scope of those whose applicability to space is not justifiable. Priorities: SCM, TDB
5. Share lessons learned and good practices, including cooperation with defense

## Future State

1. 9100 as a suitable and commonly accepted standard for QMS of space organizations
2. An effective and consistent QMS throughout the supply chain, by applying a single certification scheme (ICOP)
3. Critical space processes covered by internationally recognised certification
4. Maximum commonality, and minimum duplications and conflicts of standards applicable to space
5. Improved quality performance by adopting best practices

## Priorities: 9100 revision and guidance

- **Revision 9100:2009**
  - Collected and consolidated space comments from three sectors
  - Key change proposals from Space Forum accepted e.g. **Project Management capability, Risk management, Critical Items**
  - Existing 9100 text removed / new comments rejected when non applicable or prejudicial to space
- **Guidance for 9100 implementation in space activities**
  - Space specific topics identified (e.g. mission assurance, project reviews...)
  - Specific guidance document for space will be proposed as annex to general guidance

## Priorities: ICOP Scheme

- **Need for customers and industry to make ICOP certification more effective and efficient for space**
  - E.g. knowledge of space business is neither traceable nor required in the profile of Aerospace auditor, resulting in waste of time and lower added value of audits of space organizations
- **Increase involvement in the Other Party Management Team (OPMT) to**
  - **Monitor and foster the implementation by space organizations of ICOP feedback loops**
  - **Analyze quality problems of delivered product to identify common QMS deficiencies and focus audits accordingly**
  - **Define requirements for auditors of space organizations to have specific training or experience in the space business**
  - **Define specific familiarization / training modules on the basic space projects approach**

## Priorities: process certification

- 3rd party process certification is extensively applied by US space industry, but virtually inexistent in Asia and Europe
- Key special processes used for space hardware are not covered by PRI-Nadcap (e.g. soldering, crimping)
- IAQG SF is running a survey in parallel in the three sector, to estimate interest of space community and volume of potential market
- Results to be compared with minimum volume justifying the development of competences to certify a new process
  - For PRI-Nadcap: Min 5 major users (primes, government) and 25-30 suppliers using that process
- Potential process specifications from NASA and ECSS

## Conclusions

- **IAQG is a very successful and result oriented quality organization**
- **Mainly driven by aviation interests, but with significant impacts on space community**
- **The IAQG Space Forum has enabled the representation of space interests**
- **Good influence and results were achieved for 9100 revision**
- **Need to invest more resources and increase influence in high priority areas (ICOP, possibly Nadcap)**