"Certification Together" : Unique and innovative approach to leverage the Certification-related efforts.

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Abstract: Generally the aeronautical certification context is considered as being very demanding, but necessary because of Safety objectives we can easily understand when we are a simple passenger. However in this context we can consider several improvements:

- When a new standard is discussed, joint committees gather all the stakeholders and allow discussions between them. But once the new standard is released, the committee no longer exists and it is difficult to share experiences about application of the new standard,

- Discussions with Certification Authorities are usually possible only in the context of a real project, and generally they are based on specific cases. There is no real way for the Industry in general to express a point of view.

In addition, it is important to have a commercial offer for training, expertise and support, managed in a way that we can iterate with customers and their subcontractors in order the share their objectives and consider work packages on which experts are fully committed.

The "Certification Together" initiative is an innovative approach addressing those challenges, by mixing open approaches and a commercial offer.

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1. Introduction

When standards, or new versions of existing standards, are being written, Committees (RTCA, Eurocae,...) allow to exchange about the acceptable way to address challenges and meet certification objectives for a given domain.

But once the documents are released, the Committee no longer exists and companies are faced with the challenges of applying a generic document on specific and concrete projects. Challenges are even bigger for companies which were not part of the Committee. Until now, there has been no formal way to exchange opinions about the additional documents and guidance released by the Certification Authorities about application of the new or updated standard.

In addition, the only opportunities to have exchanges between the industry and the certification authorities are in the context of project audits, and this context makes these discussions quite difficult. It is necessary to create a context allowing generic discussions about management of emerging techniques or technologies, or special topics, without replacing project or program specific discussions of course. It also allows Industry to be proactive and propose acceptable approaches to the certification authorities.

Last but not least, such exchanges also allow to build best-of-art expert support and training, permanently updated thanks to these discussions, in order to collaborate with solution providers, R&D labs and schools.

This set of objectives is what the "Certification Together" initiative addresses, as detailed in this paper.

2. Background

The ED80/DO254 [1] context is a good example: these guidelines have been released in April 2000 in their first version. This document has been difficult to handle, and can be source of a lot of discussions, misunderstanding or misinterpretation.

That's why we decided in 2004 to create the "DO254 User Group", involving industry players in the field of airborne projects.

- Aerospace companies,
- Certification Experts and Trainers,
- Tool vendors,
- Component Manufacturers,
- Subcontractors...

We wanted to improve the applicants knowledge level and support the challenges of both EASA / FAA certification. This new standard introduced a lot of confusion, uncertainty and misunderstanding. We

wanted to facilitate and understand the value and share lessons learned.

The current status is a unique collaboration between companies acting in 2 subgroups : the original one in Europe and one in the US [4].

Each subgroup is composed of about 20 major companies, and we have around 4 meetings per year with an average of 30 attendees per meeting. Each group defines its roadmap, and because the challenges in the US and FAA context may differ from challenges in the European and EASA context, roadmaps are shared and activities are synchronized when necessary between EU and US groups.

This DO254 User Group is a great success, and has been recognized internationally as a model to use when new standards are released. There is no fee to join, and each member benefits come from the quality of the exchanges among a large number of stakeholders. All this initiative is also called "DO254 Together".

In the DO254 context, we also had the opportunity to leverage these exchanges to develop a training and expertise offer and partnerships between Expert companies, including FAA DERs, and solution providers.

The Toulouse area, mainly because of the Airbus related eco-system, concentrates a lot of synergetic skills in the scope of systems, software, hardware certification, but also for environmental (DO160), CNS/ATM and Security aspects.

This was a unique opportunity to extend the good experience we had in the DO254 context, in order to address all the domains: The first needs we can expect are related to the short term release of updated standards for Aircraft and System (ARP4754 [3]) and Software (DO178B [2]) aspects of Certification.

In addition, the international "Aerospace Valley" competitiveness cluster was representing a natural host of such an international, aeronautical-oriented initiative.

2. Certification Together

Certification Together is an initiative to create exchanges between all kinds of companies involved in airborne projects, facing certification challenges, and to provide expert solutions.

One main aspect is to leverage the expertise and synergies of several internationally recognized expert companies in the certification of critical systems. This international network and experts can be extended to additional companies providing a synergetic added value, as described later in this paper.

This initiative also involves graduate schools like ISAE, ENSEEIHT, the ONERA R&D lab, as well as tool and component providers.

The Aerospace Valley competitiveness cluster, with headquarters located in Toulouse (France), has selected Certification Together as their international Center of Expertise for Certification resource. It confirms that our joint initiative is providing benefits for the entire Industry community.

Certification Together provides a structured offer to help companies achieve their certification objectives. This offer includes:

- Training for all the certification domains: ARP4754, ARP4761, DO178B (C), DO254, DO160, DO278,…

- Expert Consulting :
  o Audits to analyze gaps between the current situation of a project or process and what is required to meet the certification objectives (i.e., gap analysis)
  o Expert support during the Gap Filling, plan writing, process improvements, and other project activities
  o Support for preparation of Certification audits (pre-certification audits)
  o Support for tool assessment and qualification
  o Support to equipment manufacturers for monitoring their subcontractors, as well as supporting subcontractor process improvements to make them more autonomous regarding certification objectives
  o Technical expertise for analysis and/or assessment of emerging solutions, tool qualification aspects and packages, COTS and IP, and so on

Certification Together also integrates animation and management of collaborative initiatives:

- Creation and management of User Groups, to exchange experiences and difficulties about new standards or updates of standards. We are currently preparing creation of equivalent User Groups related to the DO-178C, ARP 4754A, etc.

- Exchanges with schools to provide them with good input for their training programs, to share training resources, etc. It is also a resource for R&D labs who need to position their technologies and solutions in the avionics domain.

- Exchanges with tool vendors, component providers, and other stakeholders who need to understand their customers' certification needs, in order to provide new features, dedicated reports, specific documentation packages, and so on.

As an example of the animation of exchanges in this community, the first international conference on certification of systems, software and airborne electronics hardware in Europe will be organized in 2010, with participation of the certification authorities.

The Certification Authorities like FAA, EASA or others are not part of "Certification Together", which is an Industry initiative. The positioning is somehow an industry counterpart to the CAST (Certification Authority Software Team), which exists for years.
It is of course not built "against" CAST: it is anticipated to discuss and exchange on a regular basis with CAST, which will benefit from consolidated industry positions.

3. How can this work ?

This innovative approach can work because we satisfy several key parameters:

The strategy of Certification Together is compliant with the individual strategies of all the actors and contributors:

- Experts companies want to keep their expertise at a top level, and find good partners they already know if they need to collaborate to take in charge larger work packages,

- Industrial companies want to exchange, learn from others and find proper support in order to reduce risks and save time for the certification of their projects,

- Solution providers want to find an opportunity to exchange with a community of industrial companies, users and non-users, about their roadmaps and plans. They also want to find recognized experts they can partner with, in order to concentrate on their core business and services and rely on expert partners if a customer needs a certification support.

- R&D labs and projects need a certification-oriented support in order to evaluate usability of the solution, technology or technique they are working on,

- Schools need to be aware of short term and long term challenges, find experts from the industry and from expert company to train students and show internationally their involvement in understanding the certification context.

The commercial partnership in place is managed and limited to partners between which the synergy is analyzed and validated. Of course this point is a sensitive and challenging one, that's why we defined a formal process with a set of conditions to accept new candidates.

Another key parameter is our experience on creation of User Groups creating added value for all the members, recognized as an acceptable contributor by Certification Authorities (i.e. the CAST group).

To have this working, we manage and monitor the initiative with the objective to have all the investments reasonable and generating benefits for all the actors.

The key aspect is also to have all the actors and contributors working and collaborating with a proactive and open spirit. We progressed a lot on that point, as it is not so easy to have companies which are sometimes, at least partially, competitors working together.

The public entities (regional or national entities) were also very interested by this initiative and wanted to be part of it: Subcontractors at the end of the supply chain are often small or medium companies (SME), and for these companies the effort to meet certification objectives, or become autonomous as required by their customers, is not always affordable.

Thanks to the recognition of Certification Together by the Aerospace Valley competitiveness cluster, public entities can analyze the needs of these companies and decide to financially support them on a case by case basis for training, audits and definition of action plans for process improvements. Then they will have a chance to be part of the competition.

4. Conditions related to the network of experts

Even if experts are involved in open and collaborative initiatives, the network of experts represents a commercial aspect of Certification

Together. This commercial partnership can be extended to companies or individual experts if the synergy can be established.

In practice it means any company can propose its participation to our network, according to the following steps and conditions:

A preliminary exchange is necessary (phone call, discussion during an event,…) to validate understanding of the Certification Together objectives, preferably with a partner already part of the network of experts,
The company sends a first presentation to the Certification Together leader, with at least the following inputs:

- Short introduction of the company, including a focus on the activities and domain for which the contribution is proposed,

- Description of the proposed contribution: perimeter, domain and related standards, activities (training, support,…)

- What is expected from Certification Together,

- Proposed positioning compared to the expert partners already in place.

If the preliminary analysis of those inputs does not highlight any showstopper, the company is invited to a live presentation during a steering committee meeting.

The decision to integrate the company or not is based on the consensus between the partners in place and attending the meeting.

More details about this process can be obtained by contacting the Certification Together leader.

5. Access to the expertise and support offer

As "Certification Together" aggregates different concepts and contexts, from commercial aspects to open and non-commercial initiatives, we did not create a specific legal entity. A given legal status can be a good answer to one part of the initiative, but not appropriate to others.

"Certification Together" is an entry point, then customers who need training, support and expertise will contract classically with the expert company which will provide these services.

6. About User Group membership

Meetings are mainly technical, and not marketing or sales events.

The highest priority is given to industrial companies (equipment suppliers or A/C manufacturers). Other contributors such as tool vendors and IP providers,… can be concerned but it is usually more effective for them and for the Group to invite them for specific topics, after preliminary discussion with these contributors,

Companies who want to be part of the group send some preliminary information about:

- The company and its representative, especially concerning their experience in the domain addressed by the User Group.

- How they can contribute,

- What they expect from the group,

The group needs to be of a representative but reasonable size, allowing discussions to quickly reach an optimum level of maturity. Thus, highest priority is given to participants who have:

- Experience on several DAL A projects, and perspectives of future projects at the same level

- Experience of certification audits, and of several certification contexts like EASA/FAA,…

- Technical capabilities for the topics and contexts addressed by the group

In addition the company needs:

- To allocate time for 3-4 meetings per year, in Europe and/or in the US

- To allocate time for subgroup discussions, through meetings and phone calls,

- To allocate time for the review of papers, presentations, etc.

Companies who wish to simply obtain answers to the problems they may encounter, without the level of contribution required by User Groups, should consider training or consulting activities.

Important point : currently there is no fee to be part of the user group. Each company invests time and budget for attending the meetings and gets benefits because these exchanges allow them to save time and reduce risks on projects.

So we recommend being very careful about other initiatives looking similar but with a very small number of participants and a participation fee…

7. About collaboration with solution providers

Because a key aspect of "Certification Together" is certification expertise and credibility, it is necessary to keep independence and neutrality in mind regarding commercial solutions and their promotion.

The objective is clearly not to sell or distribute solutions.

As opposed to promoting the solutions themselves, through the website and seminar presentations, for example, Certification Together aims to promote the efforts of solution providers to help their users meet certification objectives.

Even a market-leader solution will not be promoted by "Certification Together" unless technical or marketing materials are available (white papers, specific presentations, dedicated packages,…) to explain how the solution helps meet certification objectives.

The experts of the "Certification Together" network will evaluate the added value of the certification-oriented marketing material that would be presented by the solution providers, before promoting this material.

A similar evaluation of the added value will be applied to a "success story" paper that would be written by users and that we could publish with the users' authorization.

Some partnerships are already in place, and others can be discussed, but usually the starting point is based on the following respective contributions:

Contribution from Solution Providers

- Integrate the Certification Together expertise offer during seminars presenting the solution. The certification experts can participate in such events to introduce/explain the certification context and highlight how the solution provider's efforts can help in this context.

- Share information with their customers concerning Certification Together events, such as training sessions or seminars focusing on their domain.

- Consider preferential pricing to the experts of the Certification Together network for product training sessions.

- Solicit the Certification Together experts for customer needs that go beyond what the solution provider can address directly through its own consulting services.

Contribution from the Certification Together network of experts:

- Help the solution provider evaluate their internal processes regarding certification objectives, building certification-oriented packages, etc. (These activities are usually included in a specific commercial agreement.)

- Review technical presentations and marketing material (whitepapers, etc.): provide an external point of view and contribute to the added value of the solution in a certification context,

- Introduce the certification context and challenges to the solution provider's sales team and application engineers, to give them better understanding of the customer expectations, where the certification-oriented packages can help,…

- Offer preferential pricing for training of solution provider employees, for sessions organized by the Certification Together network of experts,

- On the Certification Together website, publish the white papers and added value material released by the solution provider, which will highlight the credibility of this material.

- On the "Solutions" page of the Certification Together website, include a summary of the certification-oriented efforts performed by the solution provider, with a link to their webpage.

- Publish information about certification-oriented events organized by the solution provider.

- Integrate screenshots of or references to the pertinent solution and/or certification-oriented material during Training sessions and Seminars.

- Provide a first introduction to the added value of the solution to customers who may have relevant needs, then transfer the opportunity to the solution provider.

- Keep the solution provider informed of all opportunities coming from the Certification Together website, discussions during training sessions or seminars, etc.

8. Next steps

Based on the success of the DO254 group, we are considering the future DO178C and ARP4754A User Groups.

We are exchanging with their respective chairmen in order to define the schedule and conditions.

Another key step is the next Certification Together International Conference (CTIC). This conference will take place in Toulouse in October 2010, with about 250 participants representing Certification Authorities, Aircraft manufacturer, System and equipment suppliers, subcontractors, certification experts, solution providers, schools and R&D labs.

The participation should be 70% Europe, 15% US and 15% RoW (China, Russia, Canada,…)

All the news and events are published and available from the Certification Together website.

In 2010, we will also extend the Steering Committee to include not only Partners and representatives from the Aerospace Valley competitiveness cluster, but also large Aerospace companies relying on this innovative approach:

- To ensure that initial objectives are met
- To ensure that emerging needs are identified, discussed and addressed

8. Acknowledgements

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9. Conclusion

Certification Together is an initiative launched by and for the Industry to create and animate exchanges about aeronautical certification: on one hand through collaborative approaches like User Groups, on the other hand through a training and consulting offer supported by international expert partners.

In addition to its current activity and its recognition by major companies, Certification Together has been selected as the "Center of Expertise for Certification" of the Aerospace Valley international cluster.

Through all these collaborations and exchanges, the objective is to create a set of solutions in order to make the certification objectives easier to meet, by addressing Safety and Security issues in relation with industrial and productivity aspects.

10. References

[1] DO254-ED80 "*Design assurance guidance for airborne electronic hardware*", April 2000

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[3] ARP4754-ED79: "*Certification considerations for highly integrated or complex aircraft systems*", April 1996.

[4] DO254 User website : www.do254.com

[5] Certification Together website: www.certification-together.com