



Sehr geehrte Mitglieder
Sehr geehrte Damen und Herren

Wir erleben zurzeit ausserordentlich spannende Entwicklungen, die Vieles in unserem zukünftigen Berufs- und Privatalltag prägen werden. Schlagworte sind Globalisierung, Digitalisierung, Industrie 4.0 und wie sie alle genannt werden. Selbstverständlich ist auch die Luftfahrt davon beeinflusst. Nebst traditionellen und historischen Themen räumen wir in unseren Vorträgen und Veranstaltungen den aktuellen Trends und Entwicklungen breiten Raum ein, wobei der Fokus auf Technologie und nicht Spekulation liegen soll, getreu dem Namen unserer Vereinigung. Im September 2017 organisierten wir in Zusammenarbeit mit dem ICAS (International Council of Aeronautical Sciences) und der zhaw in Winterthur im Rahmen dessen Programme Committee Meeting einen anderthalb Tage dauernden öffentlichen Workshop zum Thema 'Intelligent and Autonomous Technologies in Aeronautics - Software Engineering and Unmanned Aerial Systems'. Mehr als 100 Experten aus 30 Ländern – davon etwa ein Viertel aus dem Kreis unserer Mitglieder - diskutieren neue Technologien für unbemannte und autonome Flugsysteme, Referenten aus acht Ländern präsentierten spannende Beiträge zum Thema. Rund um den Workshop entwickelte sich ein intensives Networking. Wir dürfen auf eine äusserst gelungene Veranstaltung zurückblicken. Die Präsentationen können Sie abrufen unter <http://icas.org/Workshop2017.html>.

Dr. Georges Bridel und ich haben in einer Willkommensadresse und dem Dinner-Speech die Delegierten begrüsst und aus unserer persönlichen Sicht einige Entwicklungstendenzen angesprochen, wobei wir uns ein paar durchaus auch eher kritische Bemerkungen erlaubt haben. Gerne machen wir Ihnen die beiden Referate untenstehend zugänglich.

Neue Technologien werden wir Ihnen in unserer Vortragsreihe 2018 vorstellen. Schwerpunkte werden sein 'autonomes oder teil-autonomes Fliegen' und 'elektrisches Fliegen'. Im Programm des ersten Halbjahres finden Sie die entsprechenden Themen und Referenten. Wir freuen uns, Sie und Gäste an unseren Vortragsveranstaltungen persönlich begrüssen zu dürfen.

Herzliche Grüsse

Jürg Wildi
Präsident SVFW

ICAS Programme Committee Meeting 10. – 14. Sept. 2017
ICAS Workshop 11. / 12. September 2017, Winterthur

**Intelligent and Autonomous Technologies in Aeronautics
Software Engineering and Unmanned Aerial Systems**

Welcome speech

Dr. Jürg Wildi
SVFW, President

Winterthur, 10. September 2017

Dear Dr Susan Ying / President of ICAS

Dear Prof. Shinij Suzuki / President of the programme committee

Dear Mr Künzli / President of the Town Winterthur

Dear delegates, dear guests

It is a privilege and a great honour for me in my function as president of the Swiss Association of Aeronautical Sciences to welcome you in Switzerland, especially in this marvellous town of Winterthur. 57 years ago, on the 12th September 1960, the then-Honorary president of ICAS, Dr. Theodore Karman opened the 2nd ICAS Congress in Zurich, just about 25 km from here. At this occasion, well-known Swiss scientists founded the Swiss Association of Aeronautics. I like just to mention Jakob Ackeret, a former assistant of Ludwig Prandtl and later the founder of the Institute of Aerodynamics at ETH Zurich. He is well known for the design of the very first supersonic wind tunnel with closed circuit as well as the revolutionary axial compressors and the research in supersonic aerodynamics. He was the inventor of the Mach number when he honoured the work of Ernst Mach. In his very last lecture at ETH in 1967, he gave an outlook on future air traffic and propagated the supersonic transport potential. This is one example of innovative, forward-looking and at the same time realistic thinking in aeronautics. Concorde and Tupolev 144 showed the evidence.

Aeronautics always combines innovation, technology, safety and regulation, sustained by open-minded people and international cooperation. Exactly this is the code, the DNA of ICAS and is expressed in the workshop of tomorrow and Tuesday, which deals with '*Intelligent and Autonomous Technologies in Aeronautics – Software Engineering and Unmanned Aerial Systems*'.

We have the privilege to live in an extremely interesting and challenging time. Aeronautic progress was driven by engineering science and military technology in the

early phases of flight, by stable business growth in the first four decades of commercial jet transports and by environmental friendly and profitable growth during the last 20 years. We have experienced a long phase of continuous innovation and development. As an example I take the Boeing 737 with the first flight in 1968 (nearly 50 years ago) and with a current order backlog of more than 4000 units. Technology and regulations developed and progressed hand in hand, gradually. Continuous development with disruptive elements implemented on subsystem level showed remarkable progress: In aerodynamics, flight performance, fuel savings, emission reduction, production technologies, operation procedures, company organization and more.

Today we witness a drastic change. Disruptive procedures and technologies on overall system level enter into the aerospace sector and seem to overrule established traditional aviation thinking including regulations. Aviation newcomers like Google, Amazon, Uber Elevate, to name only three, complement well-established companies like Airbus, Boeing, Rolls Royce, and all the well known. Technology keywords are artificial intelligence, connectivity, image processing, autonomy and of course drones or unmanned. All of them are topics in the workshop.

For the new potential players (or are they profit believing sorcerers or even wannabes?) as well as for many start-up's established aeronautical regulations and processes are no longer top priority. Their business model is extremely technology driven and speedy with short product cycles. Allow me to ask: Is this really the future of aeronautics?

The good message is: Disruptive minded people begin to talk to the traditional aviation oriented community and vice versa. It is a common understanding that robots must be safer than humans must, that the airspace is open for all and that a certain level of regulations is mandatory. The ICAS community plays a key role in this dialogue and – I am convinced – accepts and welcomes the new entrants and fosters cooperation. The ICAS conference and the workshop are pieces of this work of art.

I wish you a fruitful committee meeting and an inspiring workshop. I hope that you will leave Winterthur at the end of the week with many new inputs and ideas to shape the aerospace future.

Finally yet importantly, I like to thank first to our host, the zhaw with its Center of Aviation, then the town of Winterthur, ICAS – especially Axel and Bodo, and our industrial partners. You find their logos on the workshop programme. A special thank goes to the ladies of the Center of Aviation for a really professional and cautious support of this event.

Thank you for your attention.

"Revolutions", "Breakthroughs", "Disruptions"

Some considerations about slogans in today's aeronautics

Dr. Georges Bridel
SVFW, Board Member; CEAS President 2008

Winterthur, 13. September 2017

Esteemed President of ICAS, dear Susan, Ladies and Gentlemen, dear Colleagues:

It is a pleasure for me to welcoming you here in this historical place. I am former president of the SVFW Schweizerische Vereinigung für Flugwissenschaften, of the CEAS Council of European Aeronautics and Space Societies and former Head of preliminary and conceptual design and future technology of EADS, today Airbus Defence, based in Munich. And today president of the small Swiss-based ALR company.

The following comment I have read in Aviation Week on an article of 7. August entitled "Pilotless Commercial Aircraft Likely In 2020s, 2030s". The article is based on a report written by UBS this summer.

"This is what happens when the bean counters get control of an industry; only the dollar signs matter. They would just as soon have no employees, no raw materials, and no product, if only they could just print money in the basement"

Let's have a look therefore at the way how our sector has been developing in the recent years. I will briefly expand on three topics. For more there is obviously no time, I don't want to spoil appetite and ruin your conversation.

It has also to deal with the digitalization in our time. For sure we are in the midst of the process and there is no way back to comfortable times. But this does not hinder us to have a critical look at some aspects of the actual development.

1. Revolutions in Aircraft Operations?

There are multiple announcement for "Pilotless Commercial Aircraft" in the near future:

Coming back to the study from UBS: it is based on endless billions of Dollars cost-savings throughout the system by simply assuming one technical enabler, the heart of our activities, the "increased technology breakthroughs...". Well, UBS is "Union Bank of Switzerland". This amazes me. Knowing bankers fairly well, they don't like to go into details but, instead, impress you will all sorts of promises. So, there were no engineers and scientists involved in the study, people which could bring some reality into the discussion. Fundamental questions come into my mind:

- Why don't we see such breakthrough in ground-transportation systems, notably with trains, which are obviously much simpler to handle?
- Why is the Air Traffic Management System still based on mainly decades-old procedures where technical development would allow much more flexibility in take-off and landing, of course strongly IT-assisted? And not going first for the most complex task, flying without pilots on board?

- How could we see air taxis realistically operating in our dense urban areas and in all weather conditions, without pilots on board? Taking care of a most complex environment combined with fail-safe redundancies?
- Finally, more details on operational considerations will sooner or later emerge: unexpected situations where the "human sensors" and their fusion play a decisive role: eyes, ears, smell, vibration, talks between colleagues... All this replaced by on-board processing and by datalinks?

We conducted in the Military Aircraft Branch many advanced studies and operations analysis already 15 years ago, with all kind of unmanned systems and automatic assistance in operating military aircraft and systems. Operations of civil air vehicles without pilot on board are now in development of course for surveillance, a variety of missions including transport, for specific tasks and not (yet) for mass use. Safety, certification and cost aspects will dictate the realistic application. Yes, also cost: nobody will tell me if such dramatic cost reductions can really be achieved, if all the safety and operational aspects are considered. Have a look at the man-intensive UAS operations. The "bean counters" of course only see the customer reluctance as main argument slowing down the process. This is for sure not the key argument.

2. Breakthrough in developing new aircraft?

The Disruptive Process appears in many speeches. Disruptive against what? There are slogans such as "going fast", "short-cuts in the processes", "creative destruction", "revolutionize the company" and so on.

Indeed, we see successful developments and business models emerging outside the traditional industries, mainly in space. Fine examples are Space X, Virgin Galactic and some others. Space X has now a market share of 50% in the United States. And in aeronautics, we may also see such undertakings.

Are these examples matching above slogans? Definitely not, especially not with Space X.

The new, smaller companies are faster and more flexible than the large traditional industries, but they do not show short cuts in the process and most importantly, they benefit from experienced employees hired from the companies and from a pool of retired, highly knowledgeable engineers and managers. And they develop and produce with lower cost. The successful approaches today are often quite conservative. Other successful examples alive since many decades however, are also rather conservative enterprises like Dassault from France and Pilatus from Switzerland.

The conceptual design is at the forefront in the process, up to 80% of the performance characteristics, cost and market chances of the product are determined in this design phase. This phase is led or surveyed mostly by the older experienced people. Accelerating the development process is done with IT of course, with broad use of digital programs and simulation. I do not consider this a disruption. The experience of humans is fundamental to achieve a sound and quick result. The experience in aircraft development has a lot to do with the continuous work in a dedicated product line once set up long-time ago. The Airbus military transport A-400M is a typical example where the knowledge of a specific product had been lost since decades. It had to be created from scratch again, with tremendous investment of money and time! Most of the later problems were created in the early specification

and preliminary design phase where the experience is of utmost importance. Missing resistance from the program and engineering management against all sort of political influence and unrealistic ideas from the top management was strongly contributing to technical failures, significant time delays and hence, cost increase. A survey shows the considerable number of projects, where the experienced engineers are missing. Project reality is hidden often behind nice Power Point business presentations.

3. Revolutionary Management Processes?

The slogans here are "lean management", "flat hierarchy" and so on. I will be short. After retirement from an aerospace company, I often feel sorrow with my colleagues who are still there at work. They are in the continuous re-organization processes. What for? Are they creating new products, are they more efficient in developing them? Sometimes I have the impression that their only job is re-organization. Consulting companies are doing the rest and apathy is the disastrous consequence. Have consulting companies and their staff ever designed airplanes?

In the best case, the employees simply continue doing their engineering and management work and try to avoid those processes. What a waste! So, there is not at all any revolution visible.

Flat hierarchies may be useful in many cases, but where is the final responsibility for design, certification, production? Is this still identifiable in committees without a responsible leader?

Or is it melted down into some amorphous groups? We see such dramatic effects with politicians involved in the management of infrastructure projects.

But there have been quite a few successful programs with a small experienced and dedicated team, a clear objective and with little outside interference. (Skunkworks, German VSTOL projects 1955 – 1970 period, CCV 104, X-31, Solar Impulse, etc. Space X again leads today).

Finally, the IT-managed company seems to be the dream in many management heads. Some colleagues are asking the question: where are the products behind the slogan? Rightly said, that IT is not a self-sufficient aim. It is the other way round: it is an excellent instrument helping to design our new products and services.

Ladies and gentlemen, colleagues:

In our 3 examples, from operations over aircraft design and development to industrial management: IT is fundamental today, but it must be used a tool, for us experienced people and specialists and our young successors. We are in the driver seat, not the computers! ICAS groups the best of aeronautics science and research in the world. Let's make more use of our expertise, let's intensify our influence in economy and politics.

I think back to my teachers and leaders in my country: personalities such as Professor Ackeret creating the first close-cycle supersonic wind tunnel in 1934. The 1960 ICAS congress was organized by him in Zurich. I think of aircraft designer Juerg Branger from the Swiss Federal Aircraft Company (today RUAG) with very advanced, far reaching designs, the leaders of Pilatus, the former Altenrhein company FFA, directors of the former Swissair. I have gained important experience in memorable meetings with international personalities such as Ed Heinemann, the famous Douglas airplane designer, Ludwig Bölkow and Dr. Wolfgang Herbst (my pre-predecessor of the preliminary design and technology lead military aircraft)

from MBB, pilots like Bill Bedford (Hawker), Dieter Thomas (Dornier) I had the privilege to work with. Then, André Turcat (Aérospatiale), Anatoly Kvtchur (Mikoyan, Sukhoi) and many military and industrial leaders.

The role of research, development and management today is different and the responsibility for an aircraft in development is not with the chief designer alone any more. But experienced charismatic leaders are still needed. And finally, I am convinced that our young engineers and scientists will find new ways not addressed in this speech. And exploit all the opportunities modern technology offers.

Wish you a pleasant stay and a happy return back home!

Thanks to our partners and sponsors of the ICAS workshop:

