



8Tree's 'dentCHECK'— Going beyond aircraft dents

Structural damages in an aircraft are a major cause of concern for operators and MROs worldwide. The inspection and repair of such structural dents have evolved over the years with latest technology and innovation. In a candid chat with **Mr. Arun Chhabra**, founder and CEO of 8Tree Aviation, he speaks about the phased approach of 8Tree for the use of drones for aircraft inspection, their collaboration with Donecle and the massive industry response for the innovative 'dentCHECK' tool. **Swati.k** finds more...

Q- What are the worst kinds of dents seen in an aircraft? Apart from accidents and maintenance activities are there other reasons for Aircraft denting?

A- During the past decade of working closely with our airline and MRO customers, we have found that three main reasons contribute to most of the dent-damage on any aircraft, whether in-service, or in storage/pre-delivery stages.

First – routine and repeated impact from ground support equipment (GSE). This includes things like the jet-bridge, luggage trolleys, F&B hosting services, cleaning crew vehicles, de-icing vehicles, etc.

Second – Foreign Object Debris (FOD) when an aircraft is undergoing routine maintenance.

Third, and most severe – extreme-weather events, such as lightning strikes, and most notably, hail-storms. Traditionally, hail damage can render an aircraft out-of-service for weeks if not months, while damage assessment is completed. This extended period of grounded aircraft results in a significant loss of revenues for the operators and owners, which directly affects their bottom-line. By applying some of 8tree's newest developments, airlines/MROs have begun slashing these out-of-service times by 30x.

Q- After the COVID19 pandemic manual aircraft checks took a backseat and use of drones for detecting cracks or structural deformities is gaining popularity. Your views.

A- 8tree has been exploring the feasibility of and developing drone-based damage-mapping solutions since 2016. Our objective has always been to develop a flying version of our popular handheld dentCHECK inspection tool, which is already widely used by global airlines and MROs, and approved by all major OEMs, for the efficiency, accuracy and TaT benefits that it delivers. We believe that the aviation market has a distinct need for both a handheld dent-mapping tool and a drone-mounted dent-inspection solution. This view continues to be validated by the growing demand and use of 8tree's handheld dentCHECK tool by airlines/MROs. The value of the

drone-mounted dent-inspection solution is most significant on the upper surfaces of the aircraft, where common GSE options encounter accessibility and safety issues.

While there has been a lot of buzz about drones for the past several years, the majority of aviation-centric drone firms must prove themselves in a few critical areas, namely – safety of operation, technical feasibility and ultimately, regulatory approvals – before they can be considered for 'business-as-usual' in aviation maintenance. With this in mind, 8tree has taken a pragmatic phased- approach in developing its drone-mounted dent-inspection capabilities.

Having engaged with various drone firms over the past several years to realize our vision of a 'flying-dentCHECK', we recently achieved a very significant first- of-its-kind, industry milestone. Working in collaboration with Donecle, a leading aviation-centric drone firm, Dassault and the French Ministry of Defence, we just completed a exhaustive year-long field trial to inspect Rafale fighter jets.

So, what were the findings? Compelling. A Donecle drone carrying 8tree's dentCHECK inspection capabilities scanned an entire Rafale aircraft in just one (1) hour, while delivering dent measurement accuracy of 0.1mm (depth) and 2mm (size). Equipped with these compelling real-world results, Donecle and 8tree are focused on delivering similar gains to the commercial aviation sector.

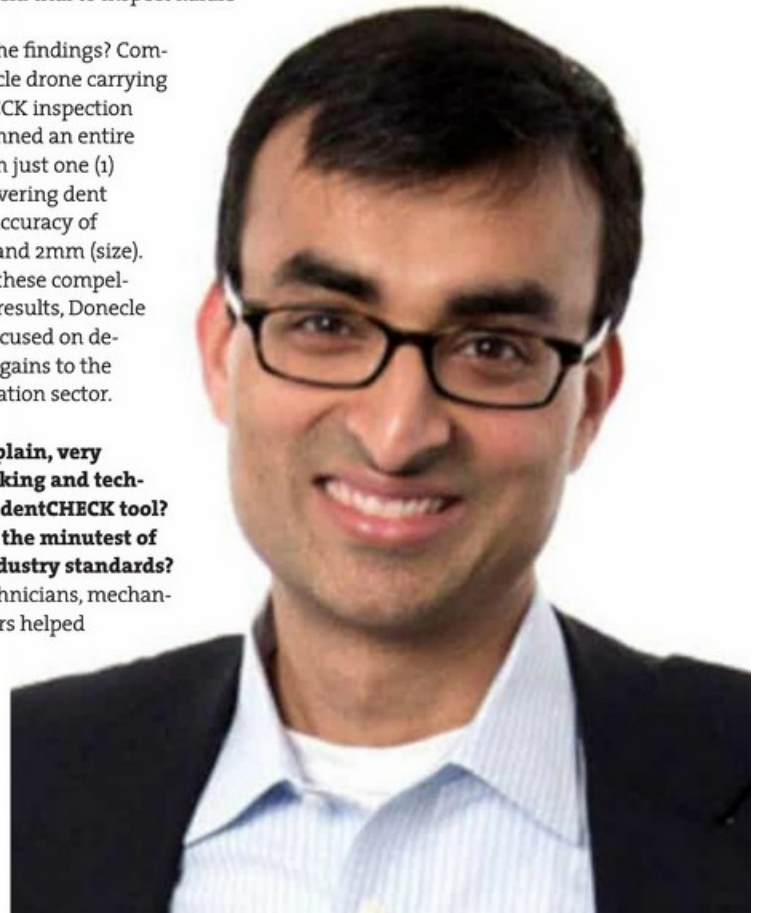
Q- Can you explain, very briefly the working and technology behind dentCHECK tool? Does it pick up the minutest of dents as per industry standards?

A- Aviation technicians, mechanics and engineers helped define every feature of the dentCHECK tool. Driven by such industry input, we developed a

one-button operated 3D structured-light scanner with integrated augmented reality (AR) that is specifically designed and built to solve the chronic problem of aviation dent-mapping. While doing so, our goal was to address the core interests of the aviation maintenance community – complete tether-less handheld-portability that delivers instantly actionable SRM-compliant measurement answers, not just 3D data. As a result, all major aircraft OEMs have recognized and certified dentCHECK, thereby empowering airlines/MROs to achieve greater than 90% time-savings when mapping dents – all with the click of one-button. dentCHECK measures dents as small as 50-microns – that's about half the thickness of a human hair!

Q- How is the industry response for dentCHECK tool?

A- In the short few years since dentCHECK was certified by all major OEMs,



the aviation industry has embraced the tool with vigour. As of today, more than a 100 dentCHECK tools are used daily across the world, by more than 3-dozen airlines, MROs and OEMs worldwide. We believe this rapid rate of adoption can be attributed to two main reasons. First, direct input from the aviation maintenance community has shaped every feature and capability of the dentCHECK tool. As such, operators tend to feel a natural affinity for and sense-of-ownership of the tool since it incorporates their input/feedback to solve their dent-mapping headaches. Second, dentCHECK empowers operators to make decisions confidently and quickly. This saves maintenance operations valuable time and money, that would otherwise be spent debating subjective, manual measurements, while allowing them to turn-around aircraft on a faster schedule.

We continue to solicit industry feedback to shape new dentCHECK features (such as our new automatic large-area mapping capability) which we release every year. Our customers enjoy the fact that their dentCHECK tools – whether acquired a few years ago, or last week – can be easily updated ‘in-the-field’ to benefit from the latest damage-mapping capabilities. As a result of these reasons, dentCHECK is rapidly becoming the aviation industry’s ‘go-to’ tool to expedite damage-mapping and reporting.

Q – What was your inspiration behind developing a technology of using portable 3D optical surface inspection tools?

A – The team at 8tree, has a decades-long pedigree in 3D optical scanning and a keen awareness of the customer experience. In our previous careers we built general purpose 3D scanners – versatile measurement equipment that requires users to develop a deep understanding of metrology so that they can make sense of the dense 3D point cloud data that is output by those traditional scanners. Putting ourselves in the shoes of the end-user, we knew there had to be a better way. We set out to combine our expertise in precision 3D optical scanning with our sensitivity of customer needs. The result has been our suite of application-specific

3D surface inspection tools. These tools, such as dentCHECK, empower users with instant-actionable measurement answers (not dense point cloud data) without requiring users to ever get involved with the underlying science of 3D scanning theory. There are trade-offs to our approach

– unlike general purpose 3D scanners, 8tree’s tools cannot be re-programmed by the user to solve a completely different measurement problem. Instead, each of our products is optimized to solve for one, and only one chronic industry problem, and deliver instant answers. Given the market’s overwhelming response to our portfolio of 3D surface inspection tools, we believe the trade-off is worth it.

Q – After dentCHECK tool what is next-in-line at 8tree?

A – Two broad themes guide ‘what’s next’ at 8tree.

First – ensuring inter-operability of our existing suite of 3D surface inspection tools. We are enhancing aerospace robotic automation flows with dentCHECK and fastCHECK integration, to help improve manufacturing quality and efficiency. In addition, driven by interest from our aviation customers, we are working to ensure that dentCHECK reports interface seamlessly to most common dent-and- buckle tracking platforms currently used in the aviation maintenance sector.

Second – addressing new chronic problem statements in new industries. Following several years of R&D and field trials, last year, we formally launched our waveCHECK tool, specifically designed to improve quality and efficiency, while eliminating subjectivity in the wind-turbine rotor blade manufacturing process. As part of launching waveCHECK, we brought onboard a wind blade industry expert to help lead 8tree’s business development in the industry.

Leading wind-blade manufacturers are starting to use waveCHECK to enhance quality inspection during their manufacturing cycle. Further down the value- chain, we see an opportunity for waveCHECK to contribute to the inspections of blades in operational wind-farms. This mirrors the journey

of dentCHECK across the aerospace value-chain – from aerospace manufacturing to the aviation maintenance sector.

Q – 8tree believes in reshaping the working of traditional industries.

How is the work culture at 8tree.

A – At 8tree, we believe in anticipating – not just responding to – customer needs. When creating our earliest products, we set out to achieve end-to-end digitalization for our customer workflows. This was done to drive greater efficiency for our customers, and in anticipation of today’s industry embracing the paperless environment.

In order to effectively anticipate the market’s needs, we foster an internal environment of heavy collaboration while also empowering each team member to make important decisions related to their sphere of expertise. For instance, our applications engineers are empowered to not only support their customers, but rather own the customer journey, keeping in mind the customer’s best interest. An internal environment of mutual trust among our team is critical to achieving this level of empowerment and collaboration.

So, what’s the result of these efforts so far? The 8tree team spans all major global time-zones – Americas, Europe and Asia – and is fluent in eight different languages. This enables us to delight our customers with novel, intuitive and efficiency-enhancing solutions to their digital surface inspection needs.

Q – Any advice you would like to give today’s young engineers planning to take up a career in 3D imaging and augmented reality?

A – 8tree hires for aptitude and initiative. A foundation of solid technical skills is, of course, a given. However, we don’t require our new team-members to walk in with prior expertise in 3D scanners, or advanced understanding of our customer industry segments. We believe that a self-driven and curious engineer can quickly ramp-up and add value to most any topic. So our advice to today’s young engineers – be curious, take initiative and don’t underestimate the value of a strong work-ethic.