STELLAR LABS – RESHAPING BUSINESS JET CHARTER

News / Business aviation

Four seconds. The time it takes for six heartbeats. Roughly what it has taken you to read to here.

In this time **Stellar** – a new digital marketplace for **business jet charter** – aims to calculate hundreds of precise and accurate quotes for a single charter request.

To accomplish this, Stellar's commercial operations systems have to work out which of the more than 5,000 airports in the US makes the most sense. It needs to perform route optimizations, calculate FAA flight regulations, aircraft performance, wind conditions and select which aircraft can actually legally fly the route. Once it has calculated optimum routing and available aircraft, it then needs to consider thousands of pricing scenarios for existing market supply and demand conditions.

Stellar needs to consider hundreds of thousands pricing rules for each individual aircraft in the system. It aims to give customers more than 100 different aircraft to select from – and then let them slice, sort, and filter by favourite operator, price, interior pictures, and safety ratings. And it wants to do this in between two and four seconds, well under the eight second attention span of a human using a computer.

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“Doing all these calculations is non-trivial to begin with,” says Paul Touw, CEO of Stellar Labs. “Doing all these calculations in under eight seconds, with 100% accuracy, is a monumental computer science problem.”

The first time that Stellar ran a request it took hours.

This may be faster than a traditional charter brokerage, but it was not fast enough. Since then Stellar’s team of 40 tech people (including five PhDs) and an array of 80 high-speed, highly networked servers, have got searches down to between two and four seconds. Now it is ready to launch.

But Stellar Labs is not just an app. Touw wants to change the entire business jet charter marketplace.

Touw says that digital marketplaces only work when both sides win and they have spent as much time working on benefits to operators as they have on the consumer side. Stellar wants to give operators tools they have never had before. For free.

Selling to operators

Touw does not just want to build an app. He wants to transform the way aircraft operator optimize their fleets, price their aircraft, and reach new. Touw says that combination of these new technologies can make operators more profitable as well as giving consumers more choice.

He understands the problems that operators face first hand. In 1996, Touw co-founded Ariba, one of the first online B2B e-commerce marketplaces. Ariba went public in 1999 and was later bought by SAP for $4.3 billion.

Touw used cash from Ariba to found XOJET in 2001, which today is one of the largest charter operators in North America. He ran it until 2008 after selling a controlling stake to global private equity firm TPG.

When he was at XOJET he spent hours trying to use technology to manage the fleet more efficiently. In a 2008 interview he told *Business Jet Traveller* that he had a “maniacal, scientific focus on efficiency, which gives customers a better product that’s more reliable for less money.”

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But he admits that he still found the problem frustrating. “I kept thinking that it could be done in a better way using technology but it just could not be done 10 years ago,” says Touw. “In 2005, optimization technology and computer speeds were simply not ready. Now they are.”

“We launched Stellar two years ago but I had begun studying optimization methods as an aerospace engineeri over 20 years ago,” says Touw. He says, “Back in those days, problems ran over night. Today, those same problems run in milliseconds.”

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Stellar includes an advanced new aircraft scheduling system – something that many companies offer – but Stellar can view aircraft schedules across all operator fleets simultaneously, including transient and empty let opportunities. It also includes sub-second route optimization and revenue management to price flights dynamically.

“For the first time ever, the industry can have a crack at revenue management – something that transformed the airline industry,” says Touw, “We can give operators something that is a quantum leap more sophisticated than the systems, spread-sheets and whiteboards they use now.”

Touw wants to change the market the same way that the commercial airline and hotel industries were transformed by computer science and maths in the 1980s.

Moneyball for business aviation

After leaving XOJET, Touw was drawn back to his software tech roots. At the same time, David Fox, Stellar’s co-founder, was also looking at the business jet market. Fox, another entrepreneur, had founded Agistix, which allows companies to track their logistics programmes. Fox had written his own business plan for business aviation and was introduced to Touw.

Both founders had extensive experience building digital marketplaces and strongly believe in using statistics to solve complex problems. And business aviation is particularly complicated.

There are several reasons why business jet operators lag behind airlines and hotels. One is that few business jet operators have the resources to invest millions in technology. Airlines have spent billions. The commercial airline and hotel industry problem is simpler because inventory is either scheduled 320 days out (airlines) or static (hotels do not move). In business aviation, the problem is dynamic.

Although airlines are extremely complex companies, running a business jet operation is harder. Airlines have schedules and know which airports they fly between. Business aviation is in complete motion – operators may only visit one airport every few years and rarely know where an aircraft will be in a few days. They also need to fly empty legs to pick up passengers.

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“Business aviation is much more complex because operators have many more choices. There are lots of little hard problems,” says Touw. “So we solve the problems using math.” Stellar has collected millions of business aviation data points and used them to create models. He likens it to *Moneyball*, the book by Michael Lewis about how the Oakland Athletics baseball team used statistics to choose teams, price players, and win games.

At the heart of Stellar are a group of data scientists: Christos Katsis with a PhD from MIT; Edwardo Chan, with a PhD from CalTech; Tad Droxee, a PhD from Stanford; Nicoleta Neagu, with a PhD from the Artificial Intelligence Laboratory (SFPL); and Gary Waldman, who has a Masters from MIT and MBA from Sloan in revenue management (RM). They have studied optimization for many years and use what is called heuristic, linear, and brute-force methods to calculate optimums in routing and pricing. “No one in the industry has ever employed people like this,” says Fox. “We are heavy on math and tech people.”

Stellar has a server team in Palo Alto, an user experience interaction and design team in San

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Francisco and a coding team in Buenos Aires. Stellar also believe the product has to be incredibly easy to use and implement- for both customers and operators.

Although every online charter site is compared to Uber, the taxi app, Stellar considers itself different. The science problems are unique, customer expectations are different, and how aircraft are operated is highly specialized. Operators do not pay to use Stellar and can opt in as many aircraft as they like. Stellar takes a commission when it becomes a matchmaker between customer and operator.

Touw says all successful digital marketplaces do four things— sourcing, pricing, discovery and settlement. As well as matching customers with flight Stellar also manages payments and settlement, even allowing consumers to authenticate transactions with fingerprint authentication.

Stellar has been in what Silicon Valley companies call Stealth-Mode for the last few years. It ended this in October 2015 when Touw announced it on stage at Corporate Jet Investor Miami. (This is their first interview that Touw has given on Stellar.)

It also held a two day meeting for aircraft operators to demonstrate its system. Over 50 people attended, and Stellar has signed up 21 operators with 510 aircraft. This represents about 20% of the US fleet. Six operators liked it so much that they asked to invest, and are now shareholders. It plans to enter Europe in 2016.

Stellar is not the only tech company targeting business jet charters. PrivateFly has been offering online bookings since 2007 – something its co-founder Adam Twidell was keen to point out at CJI Miami. Other companies like Fly Victor and JetSmarter have also successfully been selling online charter in both the UK and US. All of them have strong brands. StrataJet, another UK company, which is also targeting operators with sophisticated technology launched in October.

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But Touw (as you would expect) believes Stellar is different: “There are a lot of people offering apps but no one is creating an end-to-end digital marketplace.”

There is also room for competitors. Stellar estimates that US consumers spend $34.1 billion on private jet travel, compared to $81.1 billion on airlines.

Like the others, Stellar has also been raising funds. It has already closed two investment rounds. “We have a lot of tech to build,” says Fox. “And that means we need to raise money.”

In 2009 Touw was on a weblog discussion board for optimization enthusiasts. He later met up with entrepreneurs in San Francisco working on vehicle routing problems. He asked what market they were focusing on? They said, limos. “I was like, limos, that’s interesting. But I was thinking, business jets, that’s a bigger market and problem.”

The limo app launched later that year. It is called Uber.

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