Greater goals on the horizon

Skyrora recently enjoyed a successful launch of its Skylark Micro rocket from Iceland’s Langesanes Peninsula including a nominal trajectory for which they received the Leif Erikson Award for environmental responsibility, in particular its Ecosene project, which converts unrecyclable plastic waste into a usable high-grade aviation fuel. The launch provided vital insights into the performance of their launch infrastructure and subsystems. With greater goals on the horizon, Robin Hague, Head of Launch at Skyrora talks about their achievements and hopes for the future.

Laurence Russell, News & Social Editor, Satellite Evolution Group

Question: How has 2020 affected the state of the UK’s space economy?
Robin Hague: Fortunately for the UK space industry, it’s very flexible. In many cases, we’ve seen it capable of functioning remotely. In some cases, teams were fairly remote before 2020. Skyrora is already very familiar with collaborating over tremendous distances.

We continued with our workshop to produce PPE and hand sanitiser for local communities in the UK. That allowed us to keep our people working while we contributed to the nation’s effort against the virus. We were also thrilled to hear that the visors we’d designed for the NHS had been awarded the CE mark for European safety standards. The pandemic has inevitably pushed the UK space industry back, and Skyrora is no exception, but we’ve fared much better than other parts of the economy.

Question: Skyrora recently launched the Skylark Micro from Iceland with the assistance of the Icelandic government and Space Iceland. How have you navigated the delivery of the safety measures necessary to organise a space launch?
Robin Hague: We had to plan this operation with the safety of our staff to minimise the risk of inadvertent transmission. To do that, we followed an isolation process quite closely, especially in our work in Iceland.

Iceland uses an excellent test and trace system, which we were rightfully assured of. Visitors of the country are tested on arrival and then tested before departure with a very speedy procedure.

In terms of the safety and sustainability of the launch itself, we were pleased to make use of our safety case template, which we’ve been developing over the last couple of years. We also have a number of similar launch applications progressing through R&D channels, and we’ve been working with the Civil Aviation Authority (CAA) for the potential to launch within the UK. We’ve built up a very substantial and reliable documentation process accounting for the safety of our launches.

That’s all been transferrable to our operations in Iceland, where it’s been well received. That’s always been one of the aims of the smaller vehicles too. Building their capability, quality control and safety step by step, moving from simpler vehicles up to satellite launchers.

Question: Until now, Iceland had no permit procedure for allowing rocket launches. Considering the success of this operation do you see Iceland becoming a regular launch site for the UK, in the Langanes Peninsula or elsewhere?
Robin Hague: We’ve seen a tremendously positive response from the Icelandic authorities and the broader public. It’s something I know they’d certainly be keen to see more of. For us, our focus is to launch from the UK spaceports, but Iceland is a fantastic launch site which is well-cited for supporting the UK space industry in terms of downrange tracking and that sort of thing.

Scotland and Iceland could well become complementary locations across launch and tracking aspects of the space economy.
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Q&A: Skyrora

Question: The Skylark Micro launch plans to test onboard avionics and practice marine recovery operations. What are you hoping to learn from them?

Robin Hague: We’re taking a procedural approach. In the case of nano and micro, both use commercial off the shelf (COTS) solid rocket motors, which lets us focus on the operation, the avionics and developing launch confidence as we continue to develop our own in-house bioliquid propulsion, Ecosene.

Each step on, the rockets are supporting the next one up. As small as micro is, we’re carrying subsystems which we plan to deploy with the larger rockets. Physical launch is the ultimate test of this hardware and demonstrates conclusively what can and can’t be done. Indeed, the small solid rocket motors are actually more violent than what you would see from larger vehicles, so if the electronics can hack it with this launch, they’ll be proven for bigger launches.

Of course, to make any serious launch attempt in Europe, it’s always going to be coastal, and we want to recover all parts. That’s both because we want the materials back to track data and re-use them, but it’s also an enormous environmental responsibility.

Question: The government’s purchase of a 45 percent share of OneWeb suggests the pandemic hasn’t reversed its priority to invest in space infrastructure. What are your near-future predictions for the sector?

Robin Hague: I think we’re arriving at a very exciting moment in our history. There’s quite a large number of companies working on what would be commonly considered micro launches, vehicles at 500kg and below. We know many won’t progress to hardware, but we’re reaching the point where credible contenders like ourselves with the bioliquid Skylark L, or Virgin Orbit, Astra and Rocket Lab, which already has a number of successful launches, are becoming serious.

We’re finally reaching the point where this new wave of start-ups is aspiring to true flight.

I think there’s plenty of market share for these enterprises, and I think we’ll see a whole set of us beginning some very promising ventures, unlocking a much easier route to orbit for small payloads, which could well lead to more launches in step with the increasing degree of demand we’ve been seeing.

Question: Skyrora XL is scheduled to launch in 2023. How do you feel about that deadline?

Robin Hague: We’re cautiously optimistic. Of course, there’s a lot to be done, but our subsystems are coming along very well which the small rockets have helped with a lot, and major steps forward in ground testing our engines have been tackled.

One important point with Skyrora XL has been its nature in being designed for manufacture, modularity, and logistical convenience. That gives us a high degree of commonality between the first and second stage structure. It’s a rigorously practical design with many common parts, drawing on the innovations of new manufacturing. We’re using multiple examples of the same high-pressure tank distributed through it, which means we can very quickly arrange to demonstrate the full rocket.

Skyrora is approaching a crucial juncture as we undertake an increasing number of tests. Skylark Micro is just the beginning of a test launch campaign which has us quite optimistic that we’ll see near-space and space launch from the UK soon.