APiJET Uses KMAX to Ensure Airborne Platform Operates Correctly

IWL recently sat down with Paul Mallasch, the Senior Director of Aviation and Technology at APiJet to learn about his application of the KMAX Network Emulator.

Paul, can you please describe APiJET's business?

The APiJET solution is a low cost, high value commercial aviation data service helping airlines drive incremental operational efficiency improvements and cost savings. The APiJET solution effectively turns an airliner into a Smart Aircraft™, completely controlled by the airline, not its suppliers. The APiJET solution is an airborne and ground software system that turns streams of raw data generated by an aircraft and structures them into 'actionable data'.

Airlines then enjoy timely, logic-driven, predictive and preventive insights that solve problems to drive savings across multiple fleet types across the entire company.

"The APiJET solution has delivered value for Icelandair from the first installation. The ability to deliver value across the entire airline is unlike anything in the market today. We're so happy with the product and team that we're also installing it on our new 737 MAX."

-Captain Gretar Mar Odinsson, Icelandair Program Director.

Our Platform ensures downstream airline processes are isolated from upstream changes in hardware technology. Our Platform integrates with existing software configuration management processes. Our Platform works irrespective of computing and aircraft avionics hardware and IP communication and connectivity vendors.

What is your need or project where IWL stepped in to help you out?

Our Platform can utilized any (one or more) IP-based offboard aircraft communication link(s), but purchasing, installing and maintaining a dedicated communications infrastructure for our System Integration Laboratory (SIL) can be cost prohibitive.

For example, our current airline customer, Icelandair, is planning on utilizing two different Ku-band satellite communications systems for their fleet's air-to-ground IP communication needs.

It would be difficult to justify the costs of integrating two actual satellite communications terminals into our SIL.

By utilizing IWL solutions (KMAX), APiJET can emulate our customer's communication links for research, development and test.

So in other words, you were able to emulate your required satellite links in your lab for a much lower cost?

Yes, exactly. For much, much lower cost.

Which IWL product helped you with your need/requirement?

KMAX MM, the network emulator.

What solution where you using prior to choosing KMAX?

We were early adopters of IWL's Mini Maxwell the network emulator. We also used open source software emulators in early efforts, but found them fairly limiting and often difficult to configure.

Why couldn't you use your previous solution, Mini Maxwell?

While Mini Maxwell enabled APiJET to emulate a variety of IP-based communication links (Ku- and Ka-band satellite, cellular, etc.) Mini Maxwell assumed a fair amount of IP network knowledge. As a result, APiJET software engineers unfamiliar with IP protocol details and nuances struggled to characterize and configure Mini Maxwell for testing.

Why did you decide to look at alternatives such as KMAX?

APiJET engineers needed a network emulator with pre-existing, but realistic network communication scenarios like satellite, wifi and cellular to simplify and accelerate configuration and test. Quality Assurance engineers needed a tool to help expedite their work without worrying that they have correctly configured network protocol parameters.

We found that with the pre-defined scenarios, explanations, and diagrams of KMAX, the engineers did not have to struggle and were able to be productive right away.

What specific function, feature, or benefit made you choose KMAX?

More intuitive user interface, the library of realistic, but complete network communication scenarios. It is also much easier for our non-technical users to learn and operate KMAX.

Can you please describe how you use KMAX in your testing?

APiJET is currently emulating one of Icelandair's existing satellite communication networks to help ensure our Airborne Platform operates correctly when the air-to-ground communications link experiences increasing BER or other issues typically experienced with aircraft-based satellite network terminals (aircraft banks away from satellite visablity, northern latitude signal propagation loss, etc.)

For example, I configure different values for the Ground-to-Air and Air-to-Ground satellite communication channels:

- ► Rate Limit: maximum and average bits transmitted (bandwidth). 3MB for Ground-to-Air link versus 64KB for Air-to-Ground link, for example.
- ► Packet Delay: currently assuming ~240 milliseconds.
- ► I've asked their provider to provide me with their error statistics:
- ► Average number of dropped packets.
- ► Average number of duplicate packets.
- ► Typical BER.

We also plan on emulating Icelandair cellular communication links for a new airborne computing server currently being integrated.

We expect an aircraft WiFi integration in the future as well, with two possible scenarios; a cabin WiFi network and an aircraft-to-gate WAP network.

How has IWL's support team been for you?

Excellent. I appreciate the support team's thorough and timely responses.

Would you recommend IWL and KMAX to others?

I've recommended IWL products in the past to others and note it was a recommendation provided to me years ago that resulted in IWL as our network emulation tool provider.

Aviation Partners and iJet Technologies joined forces in January 2018 to launch a joint venture called APiJET. APiJET combines the industry knowledge, credibility and market access of Aviation Partners, with the power and effectiveness of the iJet Technologies solution to deliver real returns to the airline customer. The company is headquartered in Seattle Washington.

Paul Mallasch

Senior Director of Aviation and Technology Development

Paul has over three decades of experience in Air Traffic Management, flight-test, and software creation developing systems in NASA and commercial aerospace. Paul's expertise in remote satellite telemedicine earned a NASA Administrator's Award. His airborne communications and weather system research merited two NASA TGIR awards. He developed an airborne Linux distribution and application platform for commercial airplanes. Successes include software deployment to a major US airline providing conflict-free, time and efficient route deviation during field trials, culminating in a commercial product. Paul holds a Master's in Computer Science and enjoys hiking, woodworking, and assisting in a light sport all-electric airplane design.

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