SITA INTERNET PROTOCOL SUITE (S-IPS) CONCEPT

Improving the efficiency of new datalink services

Adding support for the Internet Protocol Suite (IPS) will improve the efficiency of new datalink services, like trajectory-based operations. This article proposes a concept that would allow ANSPs and airlines to realize the benefits of IPS connectivity, over VDLm2 connections, without the need for new avionics hardware and with only minimal changes to the existing VDL network.

TODAY'S BESPOKE PROTOCOLS

Today, VDLm2 technology is used to provide performant and reliable datalink services all over the world. The protocols used in VDLm2 connections, namely OSI and ACARS, were developed specifically for this purpose and have served the community well over the years, but they are associated with some drawbacks:

- These protocols include some information exchanges required to manage the connection itself. This effectively reduces the bandwidth available to applications.

- These protocols are very complex and extremely bespoke to this setting. This makes them difficult to maintain and to upgrade with new features.

- The number of people with expertise on these protocols is small and falls each year.

- Integration with other systems that use more modern protocols can be difficult.

- These protocols were developed when network security and resilience did not have the focus that they do today. They do not support these aspects as well as more modern alternatives.

AN OVERVIEW OF THE IPS SOLUTION

In short, the IPS Solution involves augmenting the VDLm2 network with support for another protocol, namely Internet Protocol Version 6 (IPv6). This protocol is omnipresent, well-established in the wider information technology world. A datalink network with support for this protocol would address all the issues described above:

- A datalink protocol using IPv6 would need less connection management and so would effectively increase the bandwidth of the air-ground connection by around 25%.

- IPv6 hardware, software and technical expertise can be much more easily sourced and maintained.

- Datalink applications using IPv6 will be far easier to integrate with other systems.

- Commercial off-the-shelf IPv6 equipment comes with support for contemporary security measures as standard.

SITA considers that the move to the IPS Solution will be a very important and welcome step in the evolution of VDLm2 connectivity. It is therefore vital that the approach chosen to implement this is one that can be realized quickly, cost- effectively and with minimal risk.

SITA

FOR AIRCRAFT

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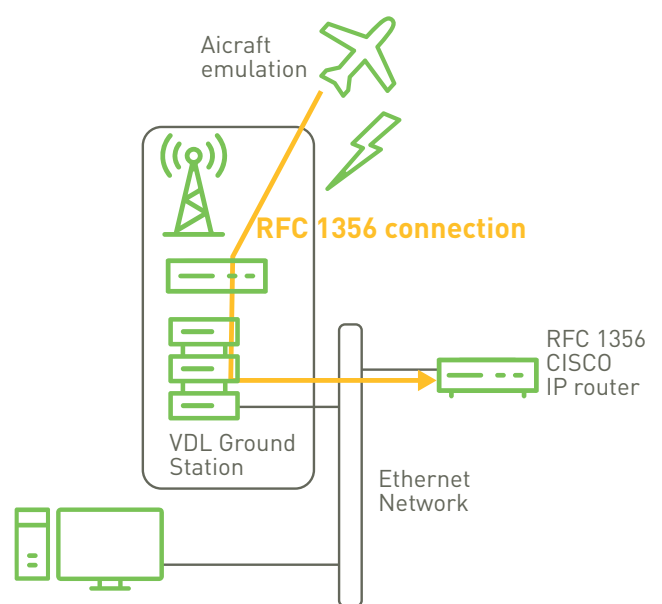
THE S-IPS CONCEPT

SITA proposes an implementation approach that will deliver the efficiencies of the IPS Solution to the VDLm2 network, while minimizing the changes required to today's infrastructure on the ground and onboard aircraft.

The S-IPS concept employs an already defined and well understood protocol, named RFC 1356, to deliver IPv6 connectivity. This low-impact approach has some significant benefits:

- **1. No New Avionics Hardware Required**
  Because the concept makes use of a protocol that exists in the VDLm2 network, it can be supported by the current generation of VDLm2 aircraft avionics hardware.

- **2. No New Protocol Required**
  Making use of a legacy and well-understood protocol, avoids the complexity and technical risks associated with defining and implementing a new protocol.

- **3. Minimal Change to Ground Network Components**
  Only a small software change is needed on the existing VHF Ground Stations managed by SITA and those managed by ANSPs.

- **4. Cost-effectiveness**
  A solution like this one, avoids the costs that would be associated with the development and then deployment of new ground and airborne infrastructure.

- **5. Speed of Implementation**
  Because the need for development effort is minimized, a solution can be delivered quickly. SITA believes that the ground network could be made ready for this solution by 2023.

SUCCESSFUL VERIFICATION ACTIVITIES

In April of 2021, SITA performed a series of verification activities to demonstrate the viability of the S-IPS concept. These tests involved connecting simulated aircraft, via the RFC 1356 and IPv6 protocols, to commercial off-the-shelf network equipment (see the high-level diagram below). As expected, robust connectivity was quickly established, demonstrating the technical viability of the S-IPS concept. These positive results have further strengthened SITA's confidence that this solution will be performant and that it can be delivered rapidly and cost-effectively.

Aicraft emulation

RFC 1356 connection

RFC 1356 CISCO IP router

VDL Ground Station

Ethernet Network

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SITA AT A GLANCE

Easy and safe travel every step of the way.

- Through information and communications technology, we help to make the end-to-end journey easier for passengers – from pre-travel, check-in and baggage processing, to boarding, border control and inflight connectivity.

- We work with over 400 air transport industry members and 2,500 customers in over 200 countries and territories. Almost every airline and airport in the world does business with SITA.

- Our customers include airlines, airports, ground handlers, aircraft, air navigation service providers, and governments.

- Created and owned 100% by air transport, SITA is the community's dedicated partner for IT and communications, uniquely able to respond to community needs and issues.

- We innovate and develop collaboratively with our air transport customers, industry bodies and partners. Our portfolio and strategic direction are driven by the community, through the SITA Board and Council, comprising air transport industry members the world over.

- We provide services over the world's most extensive communications network. It's the vital asset that keeps the global air transport industry connected.

- With a customer service team of over 2,000 people around the world, we invest significantly in achieving best-in-class customer service, providing 24/7 integrated local and global support for our services.

- Our annual Air Transport and Passenger IT Insights reports for airlines, airports and passengers are industry-renowned, as is our Baggage IT Insights report.

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