

# Saab's Target Towing Video System Upgrade

**CURTISS -  
WRIGHT**
**DEFENSE SOLUTIONS**

## Challenge

- Unhelpful system suppliers
- SWaP-constrained platform
- Redundant ancillary equipment

## Solution

- Off-the-shelf hardware
- Custom software
- Protocol conversion

## Results

- Reduced system SWaP
- Increased situational awareness
- Increased operator control and flexibility

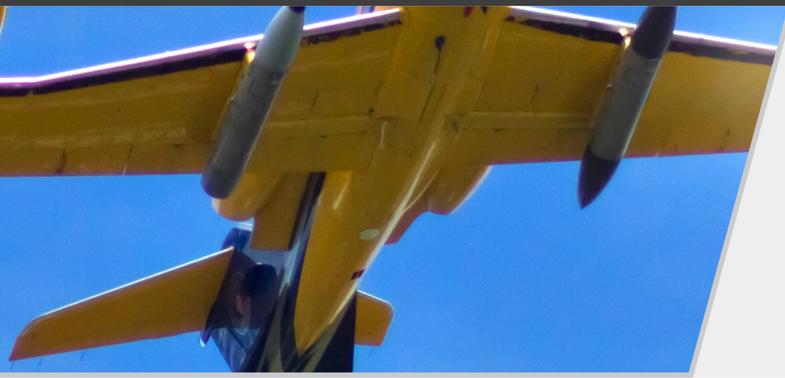
## Challenge

In the summer of 2018 when Saab went looking for a unique solution to upgrade an existing video system on-board a fleet of target towing training aircraft they did what most of us do – they googled it. After contacting a number of rugged video equipment suppliers they found the engagement process cumbersome, requiring non-disclosure agreements (NDA) prior to engaging in technical discussions, which hindered the progress of identifying a suitable solution.

Militaries around the world depend on Saab's fleet of target towing aircraft to help train their air defense crews. Prior to this project, Saab's Learjet 35s depended on external cameras connected to a hardware switch that fed a display in the rear of the aircraft to monitor the reeling in of external

tow winches and/or electronic warfare (EW) pods. The manual switch, cramped display location, and multiple keyboard/mice required to control the computer, forced Saab to look for a modern solution that gave operators flexibility and control of their system while reducing clutter on-board their size, weight, and power (SWaP) constrained aircraft.

The upgraded video system needed to be able to observe and record the process of towing missile targets or EW systems from the cameras on each wing as well as the video output from two mission computers, to provide post mission debrief to Saab's customers. The two cameras are critical for safety during target towing because of the risk of damage to the aircraft as the targets get closer.

**AVDU Mission Display**

The cameras provide visual awareness to the operator so that structural damage can be prevented while the computer recording allows Saab to provide the customer with feedback on the training mission performance. Saab required simple, intuitive operator control of both mission computers, from a single display via a single USB keyboard and mouse.

## **Solution**

Shortly after contacting us through the Curtiss-Wright Defense Solutions website, Saab was put in touch with a video management specialist and immediately started discussing how our off-the-shelf products could be tailored to fit their unique requirements. Working with the Curtiss-Wright team, a system architecture was developed around a 21.5 inch [Advanced Display Unit \(AVDU\)](#), connected to a single keyboard and mouse that acted as a central control hub for the system. By removing the hardware switch and providing software switching within the display, the operator can control both of the laptops as well as the recorders from a single touchscreen, keyboard, and mouse. The AVDU also controls two on-board video recorders that record laptop and camera feeds. One of the two VRDVs is recording the two standard definition (SD) cameras watching the targets; the other one is dedicated to mission recording in 3G-SDI video from the laptops. Both recorders have start/stop and full playback control from the display via the touchscreen. In total there are four video channels recorded and controlled from the AVDU. Because the laptops are physically located at the opposite end of the aircraft to the displays, and have a USB input, protocol conversion was required to travel the distance between the devices. The maximum cable length for transmission of a USB signal is only three meters. Curtiss-Wright solved this by modifying the software on the AVDU to enable it to convert from USB to CAN bus (enabling the signal to travel 250 meters) while also providing CAN bus to USB conversion at the laptops' end.

Shortly after a number of collaborative on-site whiteboard sessions, we developed a proof of concept demo system in our lab that met Saab's requirements based on the architecture above. When Saab received the final system six months later, it was ready to install out of the box. The installation included the custom-built software that enables the display to receive two USB inputs – one for each laptop – making it possible for the touchscreen to control the display while the mouse/keyboard controls the laptops via the AVDU. Once Saab received the system, they loaded the software onto the AVDU via a USB drive, enabling in-field software updates and configuration.

## **Results**

The system supplied by Curtiss-Wright significantly increases the operators' situational awareness during target/pod towing while giving them full control, increasing the systems functionality, and enabling them to operate it from inside the cabin of the aircraft in a more efficient manner than the previous installed system. Furthermore, on-board clutter was reduced by eliminating the independent keyboard/mouse needed for each laptop, and the hardware switch. Because the AVDU has numerous interface connections, the system is future proof with room for expansion.

The rugged, field proven, off-the-shelf components reduced overall program time and risk while the custom software development enabled the system to meet Saab's unique, challenging requirements. As of early January 2019, two complete systems are fielded, reducing the risk of aircraft damage by providing crucial visualization of the towing process on-board Saab's fleet of target towing training aircraft.

Image Credit: Bene Riobó - Learjet 35A de Saab AB no aeroporto de Visby