



# SWaP-Optimized:

## The Right Way to Add Advanced Surveillance Capabilities to Rotorcraft

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**M**odern video technology enables advanced helicopter-based surveillance capabilities that can greatly enhance police and public safety mission success.

Unfortunately, new capabilities can take up valuable space and add unwanted weight to rotorcraft platforms that already have little or no margin to spare. In addition, the process of upgrading legacy systems, say from analog to digital, can create integration difficulties, due to incompatible interface formats. The process can also introduce cumbersome, heavy wiring.

The main problem when it comes to enhancing video surveillance equipment on helicopters is straightforward: adding more weight will adversely affect fuel and power. Some of the options for addressing the challenge are less than ideal. Agencies can remove less critical equipment from their helicopters or limit mission scope by reducing range and/or duration. But how can they best equip a rotorcraft platform with today's latest video capture and recording technology without detrimentally affecting mission success?

On top of minimizing space and weight, the system integrator faced with

adding a sophisticated video management solution to a helicopter must make legacy equipment work with the latest video sources. To maximize a crew's situational awareness, an increasing number of video cameras and surveillance display systems are being added to helicopters. Making the modern video equipment work together with the platform's legacy systems can be costly and complex. The time and effort needed to integrate a myriad of legacy and modern video formats and resolutions can both add program risk and delay deployment.

## The Modular, Open Architecture Approach

The good news is a system integration approach is available that can address both of the problems encountered by agencies adding video equipment, reducing size, weight and power (SWaP) and managing format conversion to make old and new equipment work together.

The solution is a video management system (VMS) based on open architecture modules. The use of modular components helps keep wiring mass low by enabling smaller boxes to be located closer together in tight spaces.

A SWaP-optimized VMS might include analog and digital video switches, a video format converter, a digital video recorder and rugged LCD touchscreen displays. The displays should be built for use both in high-glare daytime and low-light nighttime applications. Because the rugged units work seamlessly together, they can eliminate the “rats-nest” of video cabling, while ensuring space and weight are minimized. Even better, they make it easier to keep up-to-date with the latest high-definition video formats and myriad of video interfaces used by camera and sensor vendors today.

## Focus on Format Conversion

Upgrading legacy video systems often involves a mix of older analog and newer digital interfaces, making video format conversion a key part of a modern VMS.

An example of a SWaP-optimized modular video format converter is Curtiss-Wright’s RVG-FC1 Rugged Video Gateway Format Converter. The unit is conduction-cooled so it requires no active cooling. Each unit supports two independent channels of video conversion, accepts a wide range of analog and digital video input formats, and scales and rate-converts video input signals to a similarly wide range of video output formats.

Use of the RVG-FC1 onboard a helicopter eliminates the integration challenge while remaining SWaP-sensitive. It provides a simple yet powerful solution for converting a wide range of video formats and resolutions. The small, compact unit (49 x 160 x 185 mm) weighs only 1.1 kg and operates at <15W, which means it can easily fit into the SWaP-constrained cockpits and interiors typical of helicopters.

This flexible unit supports 15 of the most common video formats and resolutions encountered in video surveillance applications. Designed for use in harsh helicopter environments, the RVG-FC1 is built to meet the rigorous DO-160G standard for avionics equipment operating temperature range, shock, vibration,

and other environmental threats. This makes it the only product in its class ruggedized for the harsh environmental conditions typical in police applications.

Because the RVG-FC1 can convert any of its supported video formats and resolutions to any other format, it makes bridging between legacy equipment and the latest video sources and syncs simple. It can be remotely controlled via CAN bus or RS-422 interfaces, or it can be programmed with a static configuration. Video formats supported by the RVG-FC1 include:

### SDI

- SMPTE 259M (SD-SDI), SMPTE 292M (HD-SDI) and SMPTE 424M (3G-SDI)
- 1920x1080i @ 59.94, 50 Hz
- 1920x1080p @ 59.94, 50, 29.97, 25 Hz
- 1280x720p @ 59.94 Hz
- 720x486 @ 29.97 Hz
- 720x576 @ 25 Hz

### Composite

- PAL CVBS (ITU-R BT.1700)
- NTSC CVBS (RS-170A)
- PAL Y/C
- NTSC Y/C

### RGB

- VGA (640x480)
- XGA (1024x768)
- WXGA (1280x720)
- SVGA (1280x1024), UXGA (1600x1200), HD (1920x1080)
- STANAG 3350A/B/C

### DVI

- 640x480
- 1024x768

- 1280x720
- 1280x1024
- 1600x1200
- 1920x1080

## A Distribution Building Block

Typically, a video distribution system is used in applications where multiple video inputs (for example, from a multi-sensor gyro-stabilized camera system) and additional signals from moving maps, mission computers, video recorders and up/down links need to be routed to multiple displays in an aircraft. Commercial, off-the-shelf VMS units provide aircraft integrators and installers with a modern solution to traditional complex aircraft installations and simplified cabling, which delivers cost and weight savings.

The RVG-FC1 provides a flexible building block for the most complex video management and integration problems. It’s interoperable with the Curtiss-Wright RVG product range, enabling complex, scalable solutions to be built easily and quickly.

For example, the format converter can be combined in a VMS with the RVG-SD1 Digital Video Switch and/or the RVG-SA1 Analog Video Switch, which are among the smallest video switches in their class. Other compatible elements available for configuring a complete VMS include rugged LCD touchscreen mission displays and digital HD video recorders.

Converting video is just one component in a modern integrated VMS. When a helicopter VMS is based on open architecture modular solutions, SWaP can be better managed and technology upgrades are easier and faster, which saves money. Best of all, it helps agencies carry more, fly further and stay in hover longer. ▼

