

*Improving Security while maintaining
Interoperability of Tactical Surveillance
Video*

The Design Benefits of an SCA Based
Video Downlink Terminal

Lloyd Palum, Harris Corporation
RF Communications Division
Rochester, New York USA
lpalum@harris.com

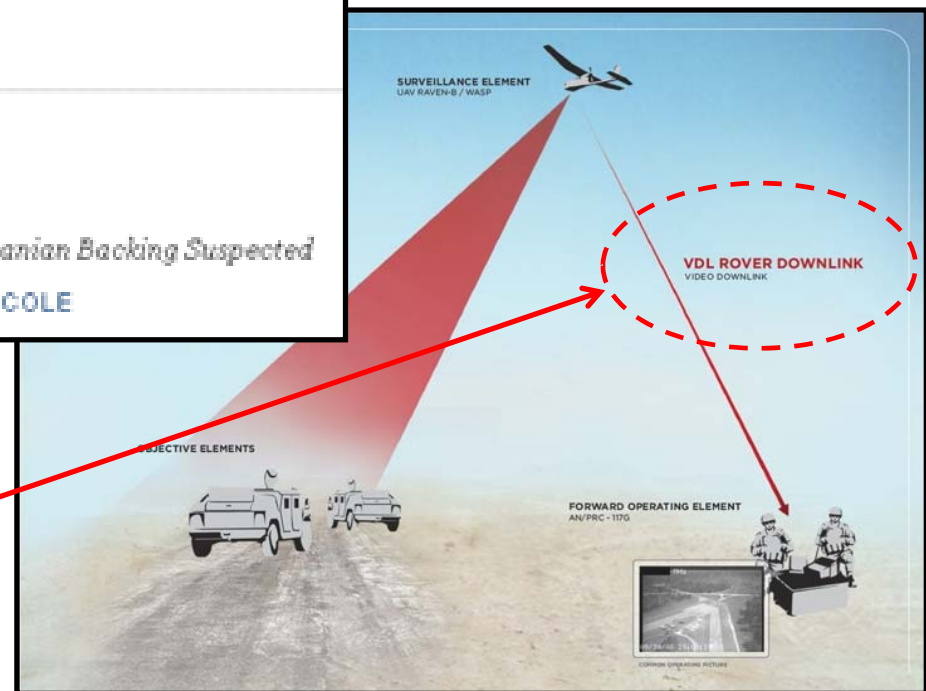
Software Defined Radios can help solve some tricky interoperability challenges.

Software Defined Radios can be used to implement more than voice and data standards. They are great for processing video too!

- Over the last 10 years...
- Quick fielding using legacy technology along with the proven value of the application set the stage for interoperability and evolutionary challenges.



VDL needs to be more robust!



- Is clear transmission so bad?
 - Being watched is a deterrent
 - Damage assessment mission is unaffected
- Still makes sense to clean up and encrypt
 - How to do it without making a mess?





Logistics

- There are 10,000s of receivers already fielded
- UAS are heavily utilized and can not be re-worked all at once



Performance

- Analog video is pretty robust. A digital equivalent that is capable of being encrypted is more complex.



Security

- Symmetric key distribution is a nightmare. How to have the right key a the right time?

SDR can help solve each of these challenges!



Logistics

- How to evolve when a long period of time is required to replace fielded transmitters and receivers?
- SDR Solutions:
 - Multi-application support on the RVT. Use the right app at the right time.
 - Similar problem to terrestrial HD radio. Define a new SDR waveform that combines something old and something new. i.e. In Band On Channel (IBOC) . Simultaneously transmit Analog (Legacy) + Digital (secure) to create a transition period.

SDR architecture can facilitate either of these approaches.



- Digital to be encrypted
- Digital with comparable spectral efficiency and perceived quality at a given receive signal strength as the current analog waveform
- Comes down to modem and video codec complexity

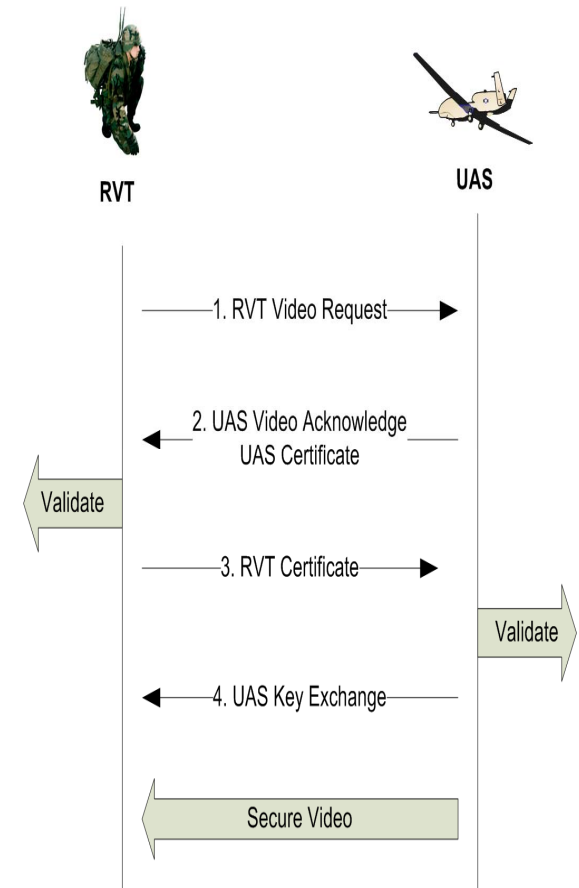
Modems	Bandwidth	Efficiency pixels/Hz
Digital A	12.5MHz	0.9
Analog	8MHz	1.3
Digital B	5MHz	2.1

Video Codecs	Resolution Frame Rate	Bit Rate	Compress Ratio
MPEG-2 MP@ML	720x480i 30fps	6Mbps	28:1
H.264 MP@L3	720x480i 30fps	3Mbps	56:1

Similar to other SDR waveform requirements

Security

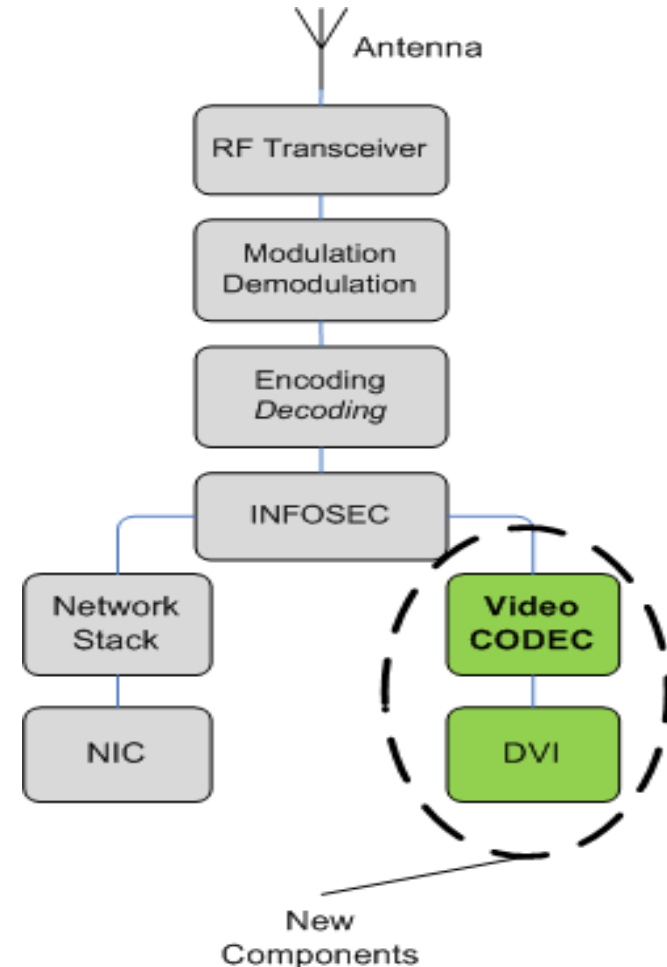
- Symmetric keys will not be practical. Too many keys and too difficult to have the “right” key at the “right” time.
- Asymmetric keys can be used to establish secure dissemination on the fly. Similar to our use of SSL on the internet.



SDR software crypto capability

- Multiband Support
- Variable Bandwidth
- Complex Modulation
- Error Correction
- Information Security
- Networking
- Video Codec
- Video Display

The Typical SDR Architecture



SDR for video too!

- Based on the SCA certified AN/PRC-152A SDR
- Added Video Devices and Services to the Architecture
- VDL Waveforms
 - Rover Analog
 - Rover Digital
 - SUAS DDL
 - ?

HARRIS

assuredcommunications

RF-7800T-HH
FALCON ISR VIDEO RECEIVER

a revolutionary portable and affordable ROVER compatible ISR video receiver

The RF-7800T Multiband Receiver is a lightweight, handheld form factor that provides ISR video feeds to ground forces.

Designed for the dismounted warfighter as well as fixed and vehicular applications, the size and affordability of the RF-7800T allows critical ISR feeds to be viewed in applications previously unrealized - outside the TOC and on-the-move. This versatility allows users to see what an aircraft or UAV is viewing in real time, often proving to be the difference between mission success and failure.

A member of the battle proven family of Falcon III[®] tactical radios, the RF-7800T includes the Falcon III SCA operating environment, allowing the product to track emerging Digital Data Link (DDL) standards through software upgrades assuring a future-proof investment.

The RF-7800T can be used with a variety of antenna and display solutions.

The Falcon III ISR Video Receiver - reliable, software defined, next generation communications from Harris, the leader in battle tested tactical radios.

Questions?

Lloyd Palum, Harris Corporation
RF Communications Division
Rochester, New York USA
lpalum@harris.com