Security System True TCO

The purchase, deployment and operation of security technology has both risks and financial goals, which are reflected in these common purchasing objectives:

- Acquire the best technology value to achieve the desired security risk reduction.
- Avoid being blind-sided by unplanned technology operations and service costs.

Achieving both objectives is the sole purpose of a Total Cost of Ownership (TCO) analysis.

It can be surprising to see how security operational costs, many of which are not in plain sight, significantly raise the cost of system ownership. It is common for the total of ownership costs to be double and sometimes even quadruple (typical when IT servers are involved) the original purchase price. However, cloud computing has significantly changed the TCO landscape for security video surveillance deployments. Moving the computing and video storage infrastructure into the cloud results in significant economies of scale. Additionally, cloud system reliability, wide-area remote access and strong system cybersecurity far surpass what is feasible for on-premises deployments.

Today, for video management systems, by evaluating all the costs to own and operate the technology (as opposed to using purchase price alone), a cloud system can be selected that has a total cost of ownership considerably below a typical on-site system. The savings vary according to the type of system deployment, but generally safe ranges are:

- Small business: 15% to 30%
- Multi-site retail operation: 30% to 65%
- Large commercial business: 20% to 35%

Furthermore, the cloud TCO savings for large commercial businesses that would otherwise host their VMS applications in a corporate data center (on-site, off-site or third-party operated) can be greater than 45%, depending upon the allocation of corporate data center IT costs.

A Simple TCO Example

TCO is an analysis meant to uncover all the lifetime costs that follow from owning certain kinds of assets. As a result, TCO is sometimes called "life cycle cost analysis." TCO attempts to uncover both the obvious costs and the "hidden" costs of ownership over time. Most of the costs involved in automobile ownership are easy to see. For example, a £24,650 automobile can cost over £49,300 to own over 5 years including the depreciation cost – the difference between the original cost and the final trade-in or resale value.

Table 1. Edmund's *True Cost to Own®* for a £24,850 Automobile

Cost Factor	Year 1	Year 2	Year 3	Year 4	Year 5	5-Year Total
Depreciation	£5,436	£2,377	£2,093	£1,854	£1,665	£13,425
Taxes & Fees	£2,083	£168	£152	£138	£127	£2,668
Financing	£1,350	£1,083	£802	£502	£182	£3,919
Fuel	£2,462	£2,535	£2,611	£2,690	£2,770	£13,068
Insurance	£1,441	£1,484	£1,530	£1,574	£1,621	£7,650
Maintenance	£1,917	£529	£960	£392	£2,480	£6,278
Repairs	£330	£385	£449	£523	£610	£2,297
True Cost to Own	**£15,019**	**£8,561**	**£8,597**	**£7,673**	**£9,455**	**£49,305**

Depreciation, taxes and fees, and financing costs are likely to be comparable for similarly-priced vehicles. However, fuel, insurance and maintenance costs will vary depending on the class, make and model of automobile. These cost variations make a vehicle TCO analysis worth doing. Performing this type of analysis on various vehicles will reveal which is truly the best buy.

Table 1 above shows the Edmund's 5-year *True Cost to Own* TCO analysis for a £24,850 2014 Dodge Charter SRT8 driven 15,000 miles per year. In this case, the cost to operate and maintain the vehicle doubles the price of the car. It is typical for many types of technologies that operational and maintenance costs are significant, including for electronic security system technologies, which is why TCO analysis is required to see the whole picture.
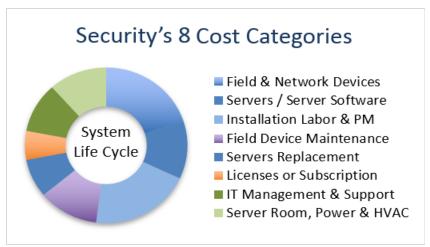
Security System TCO

Calculating security system TCO is more complex and has more data-gathering challenges than most types of product comparisons. The chart in Figure 1 shows eight security system cost categories, whose relative sizes vary depending upon type and configuration of deployment.

For small single-site deployments, calculating TCO is simple. For multi-site, large commercial, and enterprise deployments it is more complex.

However, considering video management system TCO more closely, even if a security manager

Figure 1. TCO Cost Categories for Electronic Security Systems

wanted to calculate the TCO, what benefit would there be? The competitive part of a commercial video system is not the server and network infrastructure, which is often provided or specified by the organization's IT department. The differences lie with the video management system (VMS) software.

The cost of server and network installation, maintenance and repair will be about the same for any VMS. Only the software purchase price and ongoing license fees will make a competitive difference, right? In the past, that was generally true. However, with a cloud video system, this is no longer the case.

Cloud Reduces Video Management System TCO

A well-engineered cloud-based VMS includes capabilities that are typically not affordable in on-premises systems, such as server and data redundancy, high bandwidth wide-area network infrastructure, and very strong cybersecurity. A cloud-based VMS makes these affordable due to the large economies of scale in the flexible computing, data storage and wide-area networking resources of a cloud data center and the Internet.

Thus, it is worth examining some TCO comparisons based on real project costs, to understand the cost differences between on-premises and cloud-based systems. The TCO savings vary based on type, size and configuration of system.

Notice that, in the TCO calculation examples that follow, the cloud-based system contains data redundancy and cybersecurity measures that on-premises systems simply do not offer. Other benefits include:

- Hot redundant computing
- Geographically desirable video storage locations
- Information security audits
- Continuous penetration testing
- Continuous feature delivery
- Automatically applied application security updates

In the cloud VMS, backups are verified, and cyber security controls are tested, as part of normal cloud operations.

Eagle Eye's *Intelligent Bandwidth Management* feature with local on-premises buffering typically allows existing business Internet connections to be utilized for uploading video to the Eagle Eye Cloud VMS. There is no extra cost for getting the video up to the cloud VMS.

Small Business System

Figure 2 on the following page shows the TCO summary comparison for a small business video management system for 1 location with 12 cameras and 14 days of video storage over a 5-year period. The cyber secure cloud system's total cost of ownership is 37% less (£5.280) than the cost of the less secure on-premises system. A 16-port network switch is included in the cost comparison, because it is built into the on-premises NVR

Figure 2. Small Business TCO Comparison for VMS Software, Hardware and Support

Small Business – Eagle Eye Cloud VMS						
Capacity Assumption	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	
Sites	1	1	1	1	1	
Cameras (1080p - Full HD) – 15 FPS	12	12	12	12	12	
Days of Video Storage	14	14	14	14	14	
Cost Summary	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
1. Recurring System Fees						
a. Eagle Eye Cloud VMS Subscription	£1,162	£1,162	£1,162	£1,162	£1,162	**£5,810**
b. Internet Access		(use existing)				
2. Field Hardware Purchase & Labor						
a. Eagle Eye Bridge Appliance Set-up Fee	£259	£0	£0	£0	£0	**£259**
b. Bridge & Switch Install Labor	£77	£0	£0	£0	£0	**£77**
c. Eagle Eye Network Switch - 16 POE	£298 31	£0	£0	£0	£0	**£298**
d. LAN Router Cost & Labor		(built into Bridge appliance)				
e. Internet Router Cost & Labor		(use existing)				
3. Upgrades and Updates						
a. Cloud Data Center Equipment Upgrades		(included in Cloud VMS subscription)				
b. VMS Software Update Labor		(automatic - no labor)				
c. LAN Router Update Labor		(automatic - no labor)				
4. On-Premises Electricity Cost						
a. For Bridge Appliance	£46	£46	£46	£46	£46	**£230**
b. For LAN Router		(built into Bridge appliance)				
c. For Eagle Eye Network Switch	£456	£456	£456	£456	£456	**£2,280**
5. Hot Redundant Compute & Storage						
a. Hot Redundancy Software Licenses		(included in Cloud VMS subscription)				
b. Hot Redundant Computing & Storage		(included in Cloud VMS subscription)				
6. Cybersecurity Protection						
a. Information Security Audits		(included in Cloud VMS subscription)				
b. Continuous Penetration Testing		(included in Cloud VMS subscription)				
Total Cost of Ownership	**£2,298**	**£1,664**	**£1,664**	**£1,664**	**£1,664**	**£8,954**

Small Business – Milestone Husky M20						
Capacity Assumption	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	
Sites	1	1	1	1	1	
Cameras (1080p - Full HD) – 15 FPS	12	12	12	12	12	
Days of Video Storage	14	14	14	14	14	
Cost Summary	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
1. Recurring System Fees						
a. NVR/VMS Support Plan	£90	£90	£90	£90	£90	**£449**
b. Internet Access (rarely used)		(use existing)				
2. Field Hardware Purchase & Labor						
a. NVR Cost & Licenses	£3,717	£0	£0	£0	£0	**£3,717**
b. NVR Install Labor & Setup	£205	£0	£0	£205	£0	**£410**
c. NVR Network Switch - 16 POE		(built into NVR)				
d. LAN Router Cost & Labor	£287	£0	£0	£0	£0	**£287**
e. Internet Router Cost & Labor		(use existing)				
3. Upgrades and Updates						
a. NVR Replacement & Licenses	£0	£0	£0	£4,150	£0	**£4,139**
b. VMS Software Update Labor	£0	£205	£205	£0	£205	**£615**
c. LAN Router Update Labor	£0	£102	£102	£102	£102	**£410**
4. On-Premises Electricity Cost						
a. For NVR	£912	£912	£912	£912	£912	**£4,560**
b. For LAN Router	£14	£14	£14	£14	£14	**£70**
c. For Network Switch		(built into NVR)				
5. Hot Redundant NVR						
~~a. Hot Redundancy Software Licenses~~		(excluded from deployment)				
~~b. Hot Redundant NVR~~		(excluded from deployment)				
6. Cybersecurity Protection						
~~a. Information Security Audits~~		(excluded from deployment)				
~~b. Continuous Penetration Testing~~		(excluded from deployment)				
Total Cost of Ownership	**£5,225**	**£1,323**	**£1,323**	**£5,040**	**£1,323**	**£14,234**

Multi-Site Retail Deployment

Figure 3 below shows the TCO summary comparison for a Multi-Site Retail Store video management system for 8 locations with 80 cameras and 14 days of video storage over a 5-year period. The cloud system's total cost of ownership is 49% less (£85,924) than the on-premises system. Network switches for the cameras are not included in the next two comparisons, as their costs are the same for each type of deployment.

Figure 3. Multi-Site Retail TCO Comparison for VMS Software, Hardware and Support

Multi-Site Retail – Eagle Eye Cloud VMS						
Capacity Assumption	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	
Sites	8	8	8	8	8	
Cameras (1080p - Full HD) - 30 FPS	80	80	80	80	80	
Days of Video Storage	14	14	14	14	14	
Cost Summary	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
1. Recurring System Fees						
a. Eagle Eye Cloud VMS Subscription	£13,504	£13,504	£13,504	£13,504	£13,504	**£67,520**
b. Internet Access		(use existing)				
2. Field Hardware Purchase & Labor						
a. Eagle Eye Bridges Appliance Set-up Fee	£2,072 2	£0	£0	£0	£0	**£2,072**
b. Bridge & Switch Install Labor	£3,412 612	£0	£0	£0	£0	**£612**
c. LAN Routers Cost & Labor		(built into Bridge appliances)				
d. Internet Routers Cost & Labor		(use existing)				
3. Upgrades and Updates						

Multi-Site Retail – Milestone Husky M20						
Capacity Assumption	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	
Sites	8	8	8	8	8	
Cameras (1080p - Full HD) - 30 FPS	80	80	80	80	80	
Days of Video Storage	14	14	14	14	14	
Cost Summary	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
1. Recurring System Fees						
a. NVR/VMS Support Plan	£1,440	£1,440	£1,440	£1,440	£1,440	**£7,200**
b. Internet Access (rarely used)		(use existing)				
2. Field Hardware Purchase & Labor						
a. NVRs Cost & Licenses	£70,328	£0	£0	£0	£0	**£70,328**
b. NVRs Install & Setup Labor	£1,230	£0	£0	£1,230	£0	**£2,460**
c. LAN Routers Cost & Labor	£1,472	£0	£0	£0	£0	**£1,472**
d. Internet Routers Cost & Labor		(use existing)				
3. Upgrades and Updates						

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
a. Cloud Data Center Equipment Upgrades	(included in Cloud VMS subscription)					
b. VMS Software Update Labor	(automatic – no labor)					
c. Routers Update Labor	(automatic – no labor)					
4. On-Premise Electricity Cost						
a. Bridge Appliances	£3,648	£3,648	£3,648	£3,648	£3,648	**£18,240**
b. LAN Routers	(built into Bridge appliances)					
5. Hot Redundant Computing & Storage						
a. Hot Redundancy Software Licenses	(included in Cloud VMS subscription)					
b. Hot Redundant Computing & Storage	(included in Cloud VMS subscription)					
6. Cybersecurity Protection						
a. Information Security Audits	(included in Cloud VMS subscription)					
b. Continuous Penetration Testing	(included in Cloud VMS subscription)					
Total Cost of Ownership	£19,836	£17,152	£17,152	£17,152	£17,152	**£88,444**

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
a. NVR Replacements Cost & Licenses	£0	£0	£0	£70,328	£0	**£70,328**
b. VMS Software Update Labor	£0	£816	£816	£0	£816	**£2,448**
c. Routers Update Labor	£0	£408	£408	£408	£408	**£1,632**
4. On-Premise Electricity Cost						
a. NVRs	£3,504	£3,504	£3,504	£3,504	£3,504	**£17,520**
b. LAN Routers	£196	£196	£196	£196	£196	**£980**
5. Hot Redundant NVRs						
a. Hot Redundancy Software Licenses	(excluded from deployment)					
b. Hot Redundant NVRs	(excluded from deployment)					
6. Cybersecurity Protection						
a. Information Security Audits	(excluded from deployment)					
b. Continuous Penetration Testing	(excluded from deployment)					
Total Cost of Ownership	£103,960	£12,877	£12,877	£102,308	£12,877	**£245,199**

Figure 4 on the following page shows the TCO summary comparison for a Multi-Site Enterprise video management system with 45 locations, 810 cameras, and 30 days of video storage over a 5-year period. The cloud system's total cost of ownership is 43% less (£574,035) than the on-premises system.

Figure 4. Multi-Site Enterprise TCO Comparison for VMS Software, Hardware and Support

Multi-Site Enterprise Cloud-Based System

Capacity Assumption	Year 1	Year 2	Year 3	Year 4	Year 5	
Sites	45	45	45	45	45	
Cameras (Full HD) – 15 FPS	810	810	810	810	810	
Days of Video Storage	30	30	30	30	30	
Cost Summary	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
1. Recurring System Fees						
a. Eagle Eye Cloud VMS Subscription	£137,255	£137,255	£137,255	£137,255	£137,255	**£686,273**
b. Internet Access	(use existing)					
2. Field Hardware Purchase & Labor						
a. Eagle Eye Bridges Appliance Set-up Fee	£23,010	£0	£0	£0	£0	**£23,010**
b. Bridge & Switch Install Labor	£6,917	£0	£0	£0	£0	**£6,917**
c. LAN Routers Cost & Labor	(built into Bridge appliances)					
d. Internet Router Cost & Labor	(use existing)					
3. Upgrades and Updates						
a. Cloud Data Center Equipment Upgrades	(included in Cloud VMS subscription)					
b. VMS Software Update Labor	(automatic – no labor)					
c. Routers Update Labor	(automatic – no labor)					
4. On-Premise Electricity Cost						
a. For Bridge Appliances	£8,280	£8,280	£8,280	£8,280	£8,280	**£41,400**
b. For LAN Routers	(built into Bridge appliances)					
5. Hot Redundant Computing & Storage						
a. Hot Redundancy Software Licenses	(included in Cloud VMS subscription)					
b. Hot Redundant Computing & Storage	(included in Cloud VMS subscription)					
6. Cybersecurity Protection						
a. Information Security Audits	(included in Cloud VMS subscription)					
b. Continuous Penetration Testing	(included in Cloud VMS subscription)					
Total Cost of Ownership	£175,762	£145,535	£145,535	£145,535	£145,535	**£757,900**

Multi-Site Enterprise Premise-Based System

Capacity Assumption	Year 1	Year 2	Year 3	Year 4	Year 5	
Sites	45	45	45	45	45	
Cameras (Full HD) – 15 FPS	810	810	810	810	810	
Days of Video Storage	30	30	30	30	30	
Cost Summary	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Tota**l
1. Recurring System Fees						
a. NVR/VMS Support Plan	£8,100	£8,100	£8,100	£8,100	£8,100	**£40,5**
b. Internet Access (rarely used)	(use existing)					
2. Field Hardware Purchase & Labor						
a. NVRs Cost & Licenses	£558,439	£0	£0	£0	£0	**£558,4**
b. NVRs Install & Setup Labor	£13,835	£0	£0	£13,835	£0	**£27,6**
c. LAN Routers Cost & Labor	£12,902	£0	£0	£0	£0	**£11,9**
d. Internet Routers Cost & Labor	(use existing)					
3. Upgrades and Updates						
a. NVR Replacements & Licenses	£0	£0	£0	£558,439	£0	**£558,4**
b. VMS Software Update Labor	£0	£4,612	£4,612	£0	£4,612	**£13,8**
c. Routers Update Labor	£0	£4,612	£4,612	£4,612	£4,612	**£18,4**
4. On-Premise Electricity Cost						
a. For NVRs	£19,710	£19,710	£19,710	£19,710	£19,710	**£98,5**
b. For LAN Routers	£630	£630	£630	£630	£630	**£3,1**
5. Hot Redundant NVRs						
a. Hot Redundancy Software Licenses	(excluded from deployment)					
b. Hot Redundant NVRs	(excluded from deployment)					
6. Cybersecurity Protection						
a. Information Security Audits	(excluded from deployment)					
b. Continuous Penetration Testing	(excluded from deployment)					
Total Cost of Ownership	£613,616	£37,664	£37,664	£605,326	£37,664	**£1,696,1**

Cloud System TCO Is Simply Better

The above TCO comparisons underscore the typical advantages of cloud-based over premises-based video management systems. The hard and soft benefits are clear:

- **Lower TCO.** Lower total cost of ownership.
- **Lower Up-Front Costs.** Lower up-front expenditure costs.
- **Full Hot Redundancy.** Data storage and video recording and processing are fully redundant.
- **Cybersecurity.** Strong cybersecurity including data encryption in transit and at rest.
- **Mobile Performance.** Better wide-area mobile device performance.
- **Automatic Updates.** Automatic security and feature updates with no action needed by the service provider.
- **Only Pay for What you Use.** Cloud customers can add and subtract video analytics and other system capabilities on demand, paying only for the period in which they use them.

- **Instantly Adjustable Video Retention.** Cloud customers can expand video retention and recording resolution and frame rate on a per-camera basis, without having to make any on-premises infrastructure changes.
- **No Refresh Cost Bump.** There is no server refresh cost bump, typically required with on-premises systems for: (a) upgrading outdated server computers for increased processor power and memory, to meet new software requirements; and (b) replacing hard drives nearing their failure point.
- **No Downtime and Accelerated New Features.** True cloud systems remains current through *continuous delivery* software engineering, incrementally improving software in intervals of weeks, rather than months or years. Security/bug-fix updates and version upgrade downtime are eliminated as are staff learning curves.

About Eagle Eye Networks

Eagle Eye Networks (www.een.com) delivers the world's first on-demand cloud-based security video management system providing both cloud and on-premise recording. Its flagship product is the *Eagle Eye Cloud Security Camera VMS*, which is the basis for the TCO comparisons in this paper. The Cloud Security Camera VMS works with a broad range of analogue and IP video cameras, providing secure encrypted access to cloud storage via an onsite bridge appliance, with on-premise video storage also available. Eagle Eye also provides an open cloud video API for integrations and application development, enabling customers and partners to easily realize further value while retaining the benefits listed above.