

DS-09

High Latency, Higher Stakes

Derek, Surayyah, Harsha, Skyler, Julia, Abdullah



H4DIPLOMACY

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Introduction



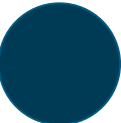
Weeks 1-4



Weeks 5-8



Weeks 11-14

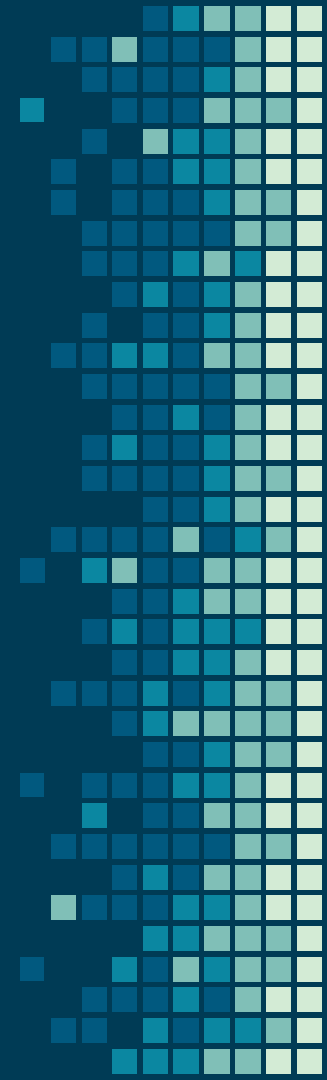


Conclusion





TEAM SUPER COOL



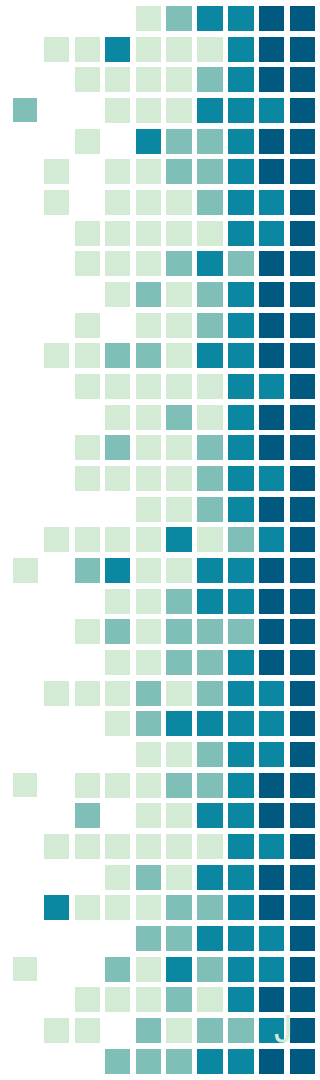
MEET THE TEAM

Abdullah, Harsha, Surayyah, Derek, Skyler, Julia



ORIGINAL PROBLEM STATEMENT:

Technology Operation Groups (TOGs) need a way to more quickly transmit high-definition video data from surveillance systems in the Western Hemisphere Affairs (WHA) region back to domestic command centers in order to make better informed decisions on how to respond to threats at overseas offices.





Countermeasures Front Office DAS

Ronald W. Stuart, Deputy Assistant Secretary



Security Technology

Office Director – Tamika D. Abbott



Physical Security Programs

Deputy Assistant Director – Rick Gregory



Diplomatic Courier

Courier Service Director – Jose (Eddie) Salazar

Countermeasures Program Division

Facility Security Engineering Division

Security Technology Operations Division

Security Systems Integration Division

Physical Security Division

Facility Security Division

Weapons of Mass Destruction

Defensive Equipment & Armored Vehicle Division

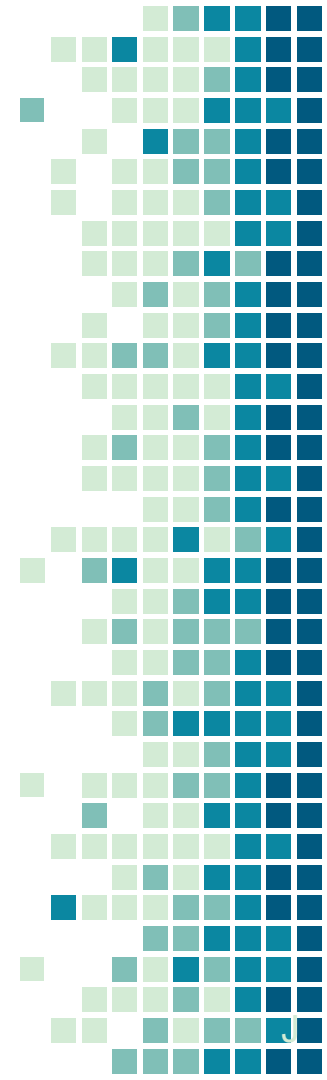
Project Coordination Division

Bangkok Regional Division

Frankfurt Regional Division

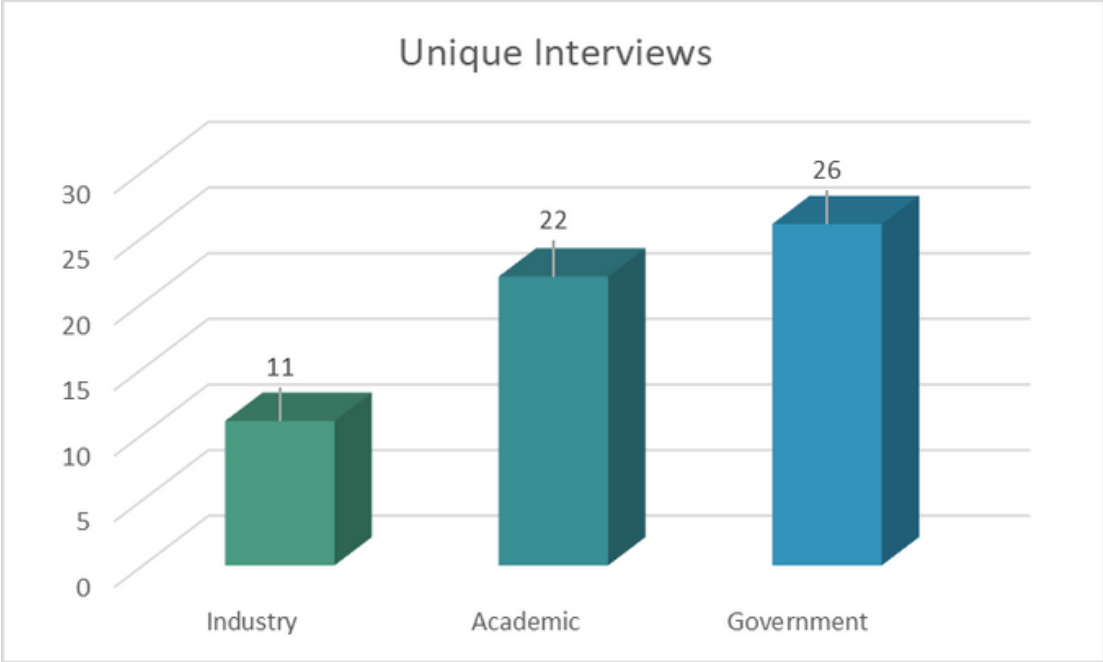
Florida Regional Division

Washington, D.C. Regional Division

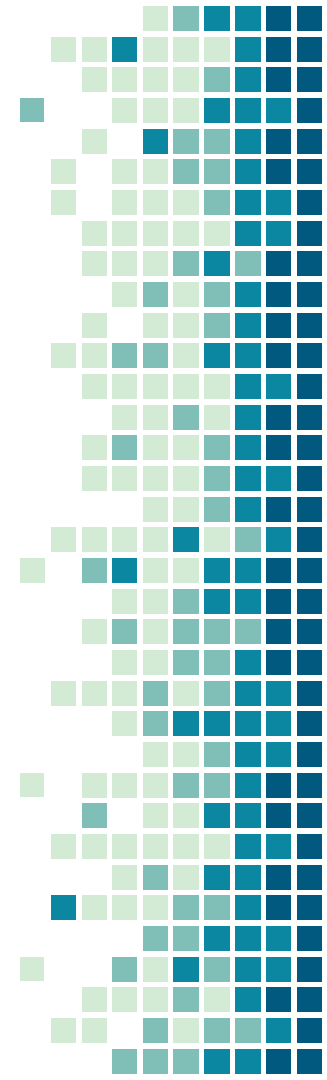
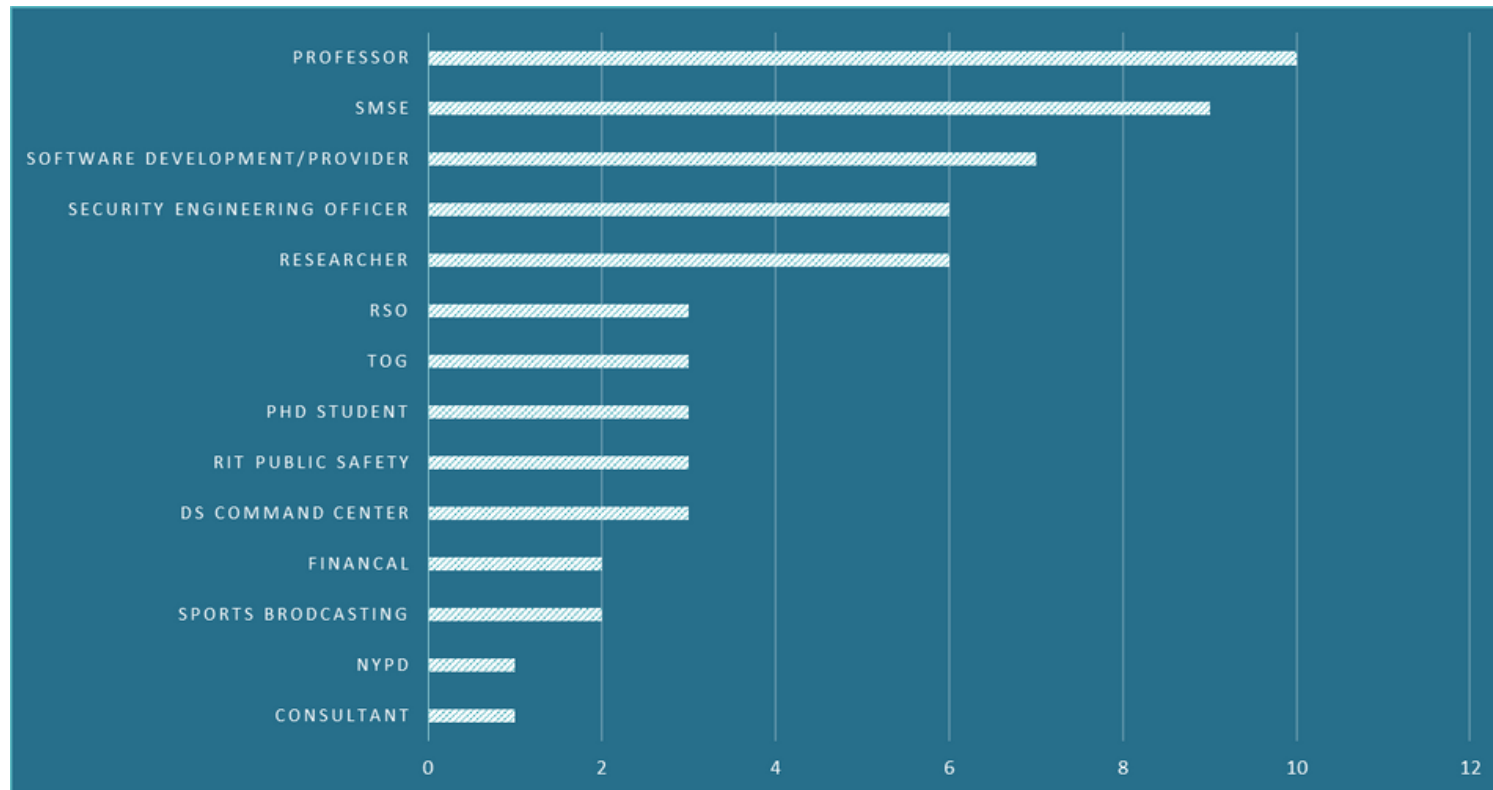


Interview Breakdown By Sector

Across all 15 weeks we had a total of 59 unique interviews across 3 sectors:

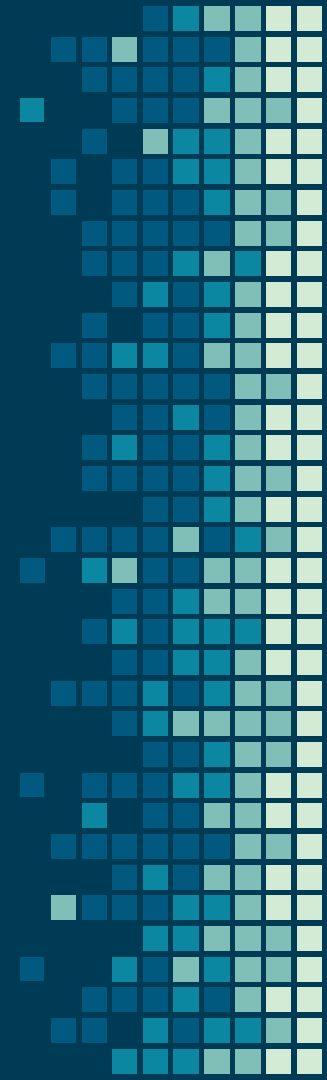


INTERVIEW ARCHETYPE BREAKDOWN



WEEKS 1-4: WHAT ARE WE DOING?

Total Completed Interviews: 5



FIRST INTERVIEWS

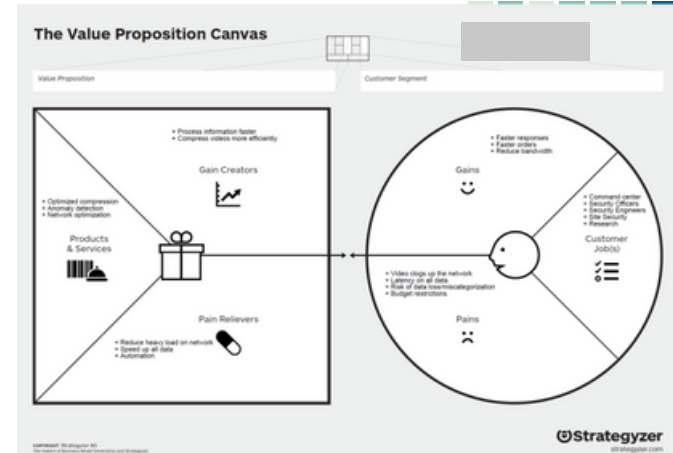
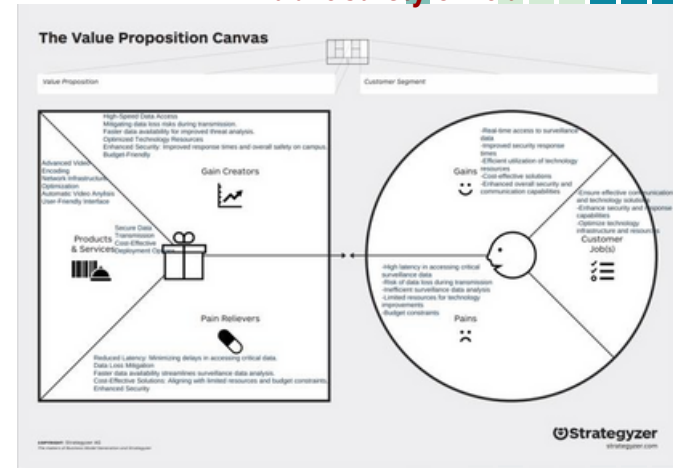
- RIT Faculty in security and networking
- Meetings with our sponsor Nathan Lingenfelter










Goal:

- + Understand local RIT surveillance
- + Get basic understanding of problem

“The heavy load on the system is slowing down more than just video transmission.”

RIT Public Safety Official



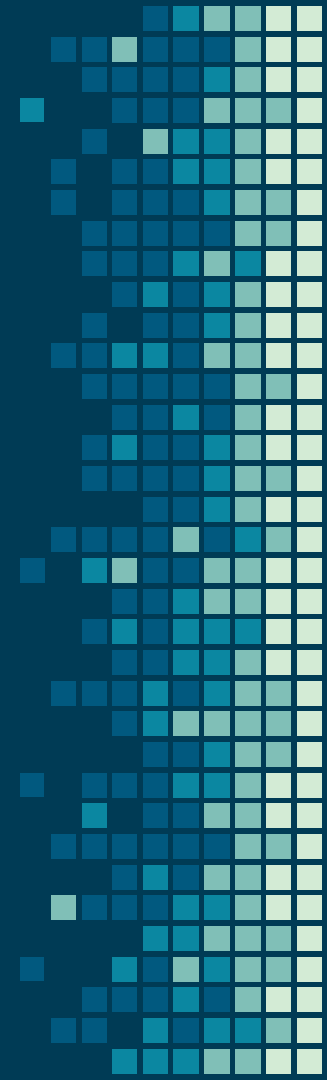
The Mission Model Canvas		Mission/Problem Description:	Designed by:	Date	Version
		DS - 09	Whole Team	09/19/23	01
Key Partners  <ul style="list-style-type: none"> Bureau of Diplomatic Security Countermeasures Office of Security Technology Security Systems Integration Division (DS/C/ST/SSI) 	Key Activities  <ul style="list-style-type: none"> Computer science Network engineering Video encoding Multicasting Network infrastructure 	Value Proposition  <ul style="list-style-type: none"> Optimizes Technology Operation Groups response speeds Leads can get faster information from their teams Allows Homeland DS personnel to have access to video data after an event faster and thus make educated decisions sooner Improve response times for regional offices awaiting decisions from homeland leadership 	Buy-in Support  <ul style="list-style-type: none"> Eliminated wasted time for TOGs Faster response times saves lives More reliability which means possible increase in funds Regional offices receive orders from DS leadership back home reducing downtime after events 	Beneficiaries  <ul style="list-style-type: none"> DS command center Regional Security Offices Security engineering officers Network TOG's (Technology operation groups) Site security personnel 	
	Key Resources  <ul style="list-style-type: none"> Software/Hardware <ul style="list-style-type: none"> encoding algorithms improved network architecture new delivery protocols 		Deployment  <ul style="list-style-type: none"> Reports on higher video streaming Network improvements/video Encoding improvements 		
Mission Budget  <ul style="list-style-type: none"> 		Mission Achievement/Success Factors  <ul style="list-style-type: none"> Faster video streaming and response time 			



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WEEKS 5-8: GETTING OUR FOOTING

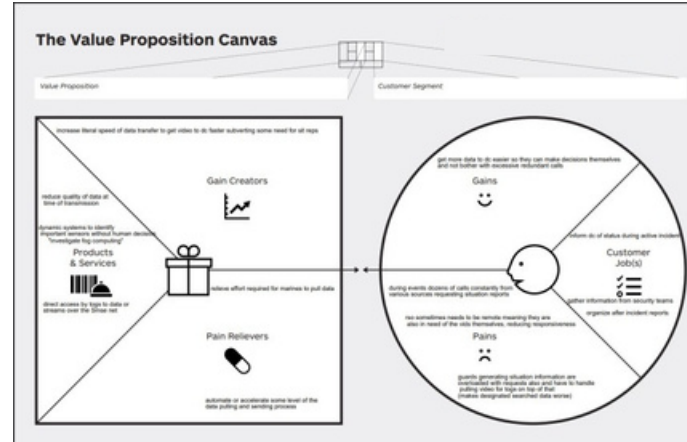
Total Completed Interviews: 34



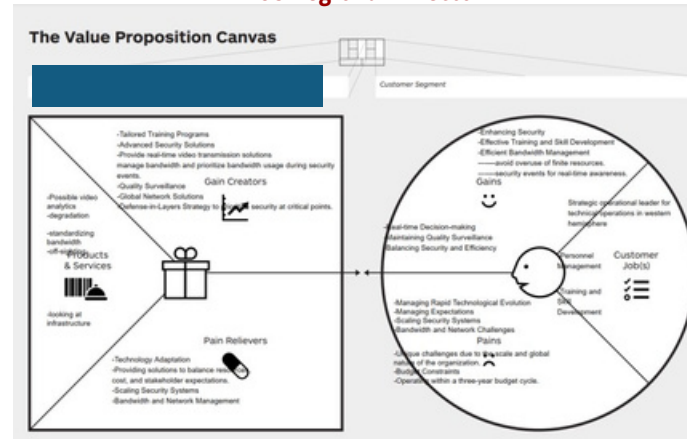
HOW ARE RSOs IMPACTED?

- Assessment of regional threat landscape
- Implement reporting/prosecuting
- Training and awareness

DOS Regional Security Officer



DOS Regional Director



“During events we receive dozen of calls requesting situation reports...sometimes we need the videos themselves.” -RSO

“We need to manage stakeholder expectation when it come to a solution.” - RSO

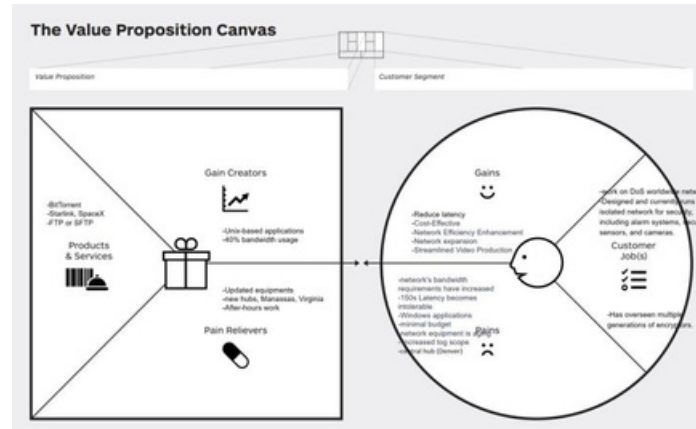


THE SMSe NETWORK

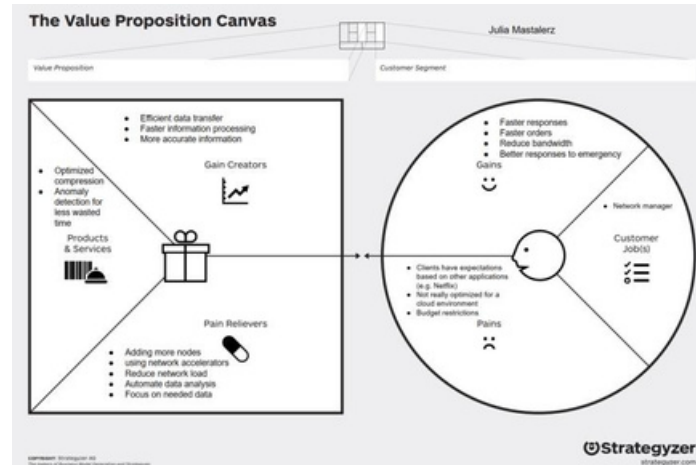
- Video services run on the SMSe network
- The network has a minimal budget
- Clients have high expectations based on other applications
- Need to stay within 40% bandwidth usage

“The TOGs scope has increased, they require more and more video data” - SMSe

SMSe Network Architect



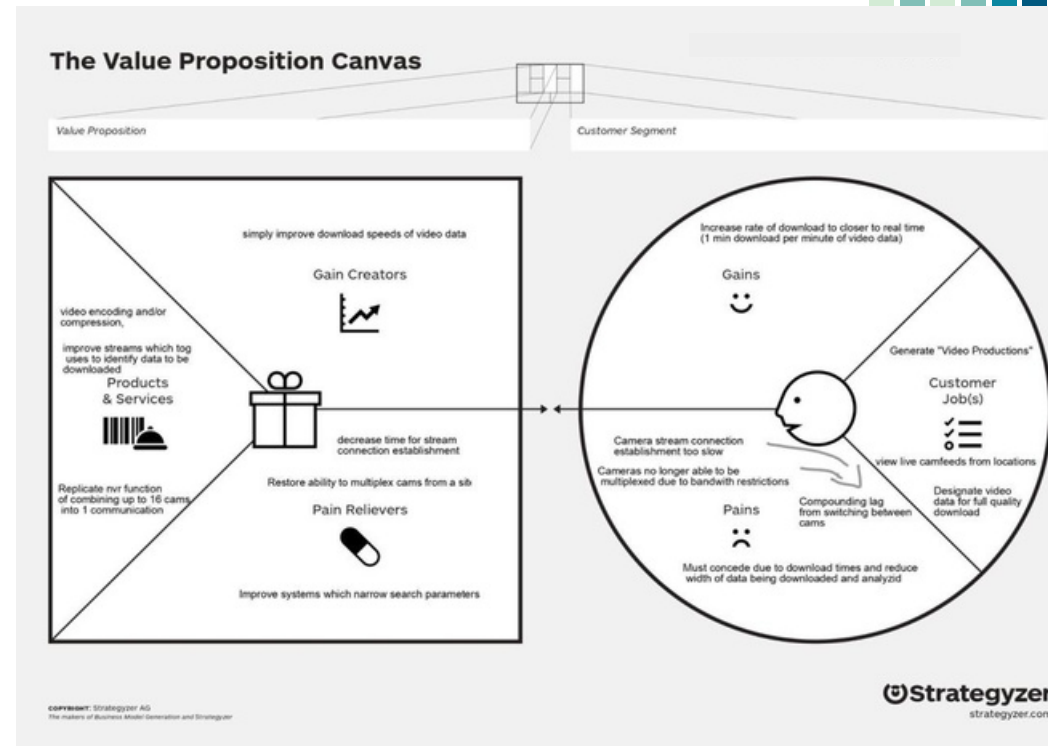
SMSe Program Manager



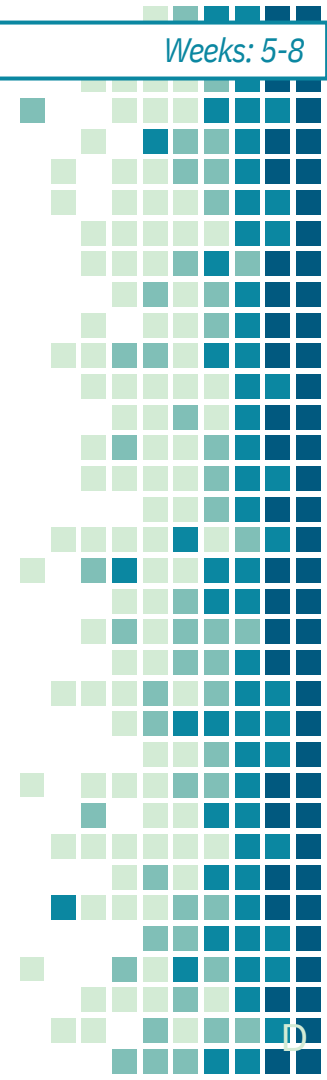
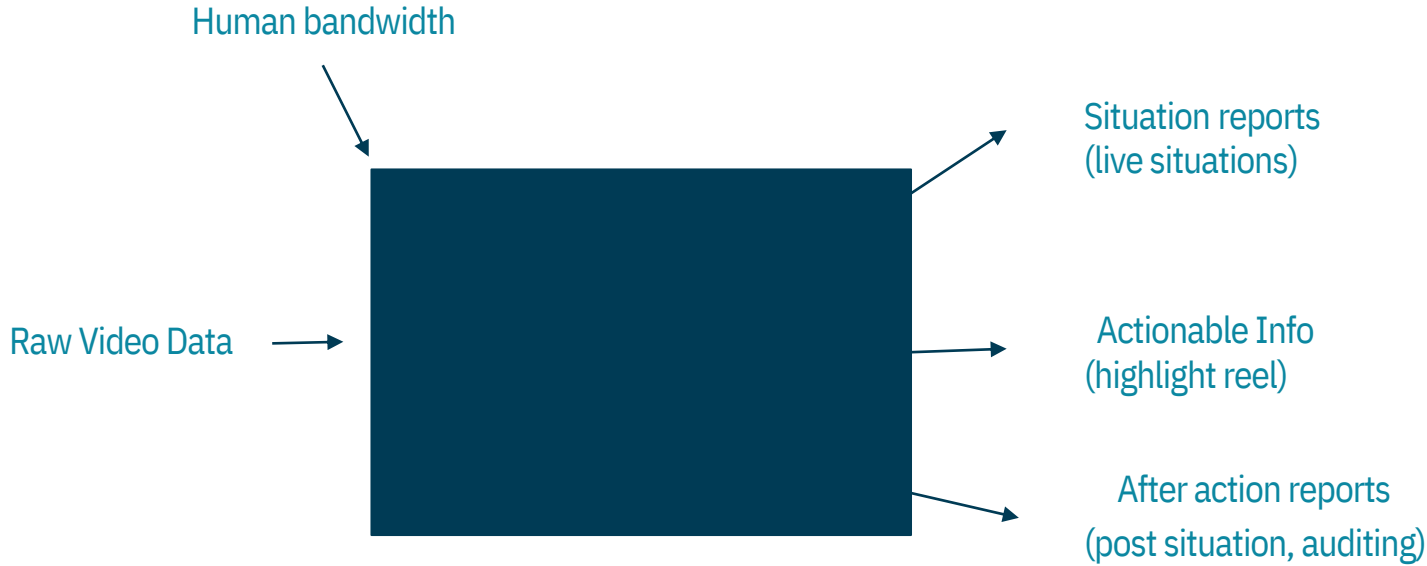
CONVERSATIONS WITH TOG MEMBERS SPARK UNDERSTANDING








- Ultimate goal for TOG is the creation of “Video productions”, and the biggest hurdle is simple download speed.
- This is an emerging issue that did not exist while using previous analog systems
- Bottleneck occurs over local isp infrastructure (not internally solvable)

TOG (Deputy)



THE FIRST MINIMUM VIABLE PRODUCT (MVP)



The Mission Model Canvas		Mission/Problem Description: DS-09	Designed by: Whole Team	Date 10/03/23	Version 04
Key Partners  <ul style="list-style-type: none"> Bureau of Diplomatic Security Countermeasures Office of Security Technology Security Systems Integration Division (DS/C/ST/SSI) Nathan Lingenfelter 	Key Activities  <ul style="list-style-type: none"> Computer science network engineering video encoding multicasting network infrastructure 	Value Proposition  <ul style="list-style-type: none"> Optimizes Technology Operation Groups response speeds leads can get faster information from their teams Improved video production turnaround Allows Homeland DS personnel to have access to video data after an event faster and thus make educated decisions sooner Improve response times for regional offices awaiting decisions from homeland leadership Reduced SMSe bandwidth usage on shared networking hardware Reduce workload during incidents 	Buy-in Support  <ul style="list-style-type: none"> Eliminated wasted time for TOGs more reliability which means possible increase in funds regional offices receive orders from DS leadership back home reducing downtime after events Improved access to network devices(cameras) for troubleshooting 	Beneficiaries  <ul style="list-style-type: none"> DS command center ICC (contact pending) Regional Security Officers <ul style="list-style-type: none"> Ben Daniels (Ottawa) security engineering officers <ul style="list-style-type: none"> John murray (Mexico city) Jason Hewkin (Ottawa) SMSe network engineers/architects TOG's (Technology operation groups) <ul style="list-style-type: none"> Lain Cobb Valentine Bon Site security personnel <ul style="list-style-type: none"> Marine security guards 	
Mission Budget  <ul style="list-style-type: none"> 	Mission Achievement/Success Factors  <ul style="list-style-type: none"> Faster video streaming and response time (specifics still unknown) <ul style="list-style-type: none"> Stream connection establishment ~5 secs each 50% increase in video productions completed within 48hrs Ideal Download speed approaching 1 min per 1 min video data Reduction in bandwidth usage overall Retention of full quality video for after-action reporting/prosecuting 				



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Original Problem Statement

Technology Operation Groups (TOGs) need a way to more quickly transmit high-definition video data from surveillance systems in the Western Hemisphere Affairs (WHA) region back to domestic command centers in order to make better informed decisions on how to respond to threats at overseas offices.

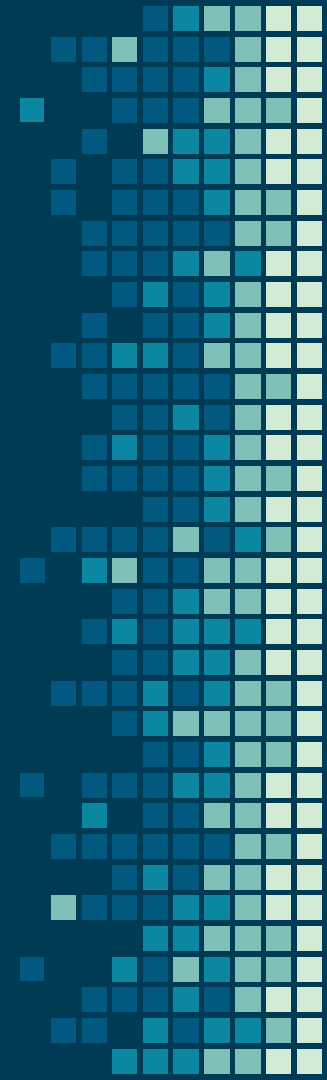
First Pivot

Technology Operation Groups (TOGs) **need prompt access to important video data of interpretable quality from remote sites** ` surveillance systems across the Western Hemisphere Affairs region in order for DC decisionmakers to form incident response plans. **TOGs and regional security staff less promptly require access to high quality video data from these systems to generate post-incident reviews and prosecutions.**

WEEKS 9-10: IDEAS

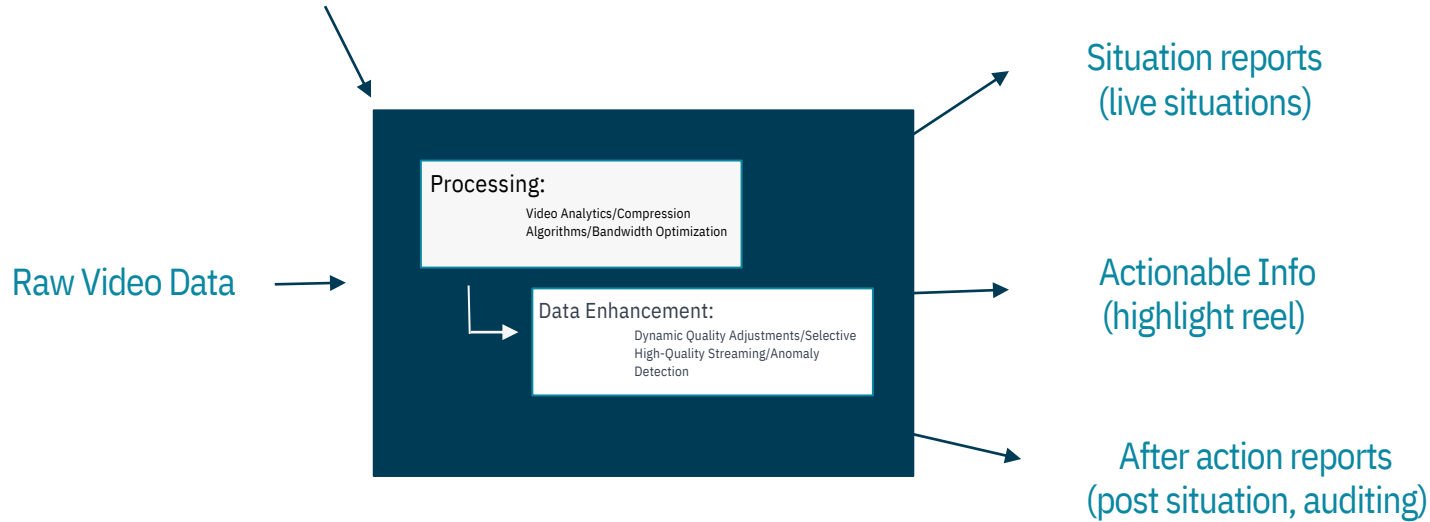
BEGIN

Total Completed Interviews: 40

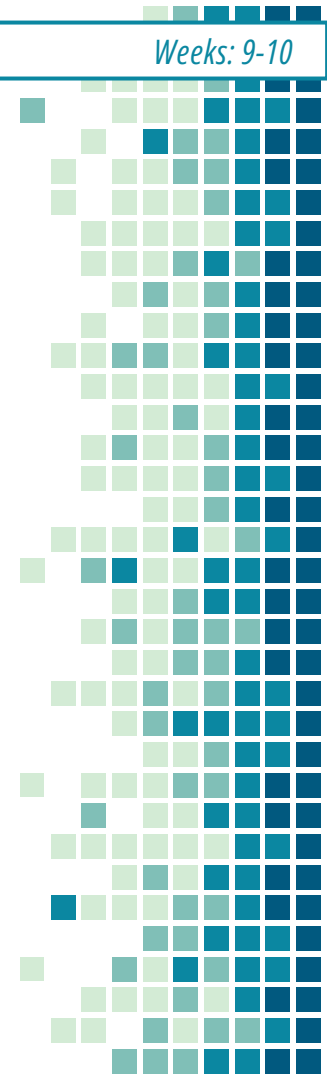


WEEK 9: MVP

Human bandwidth



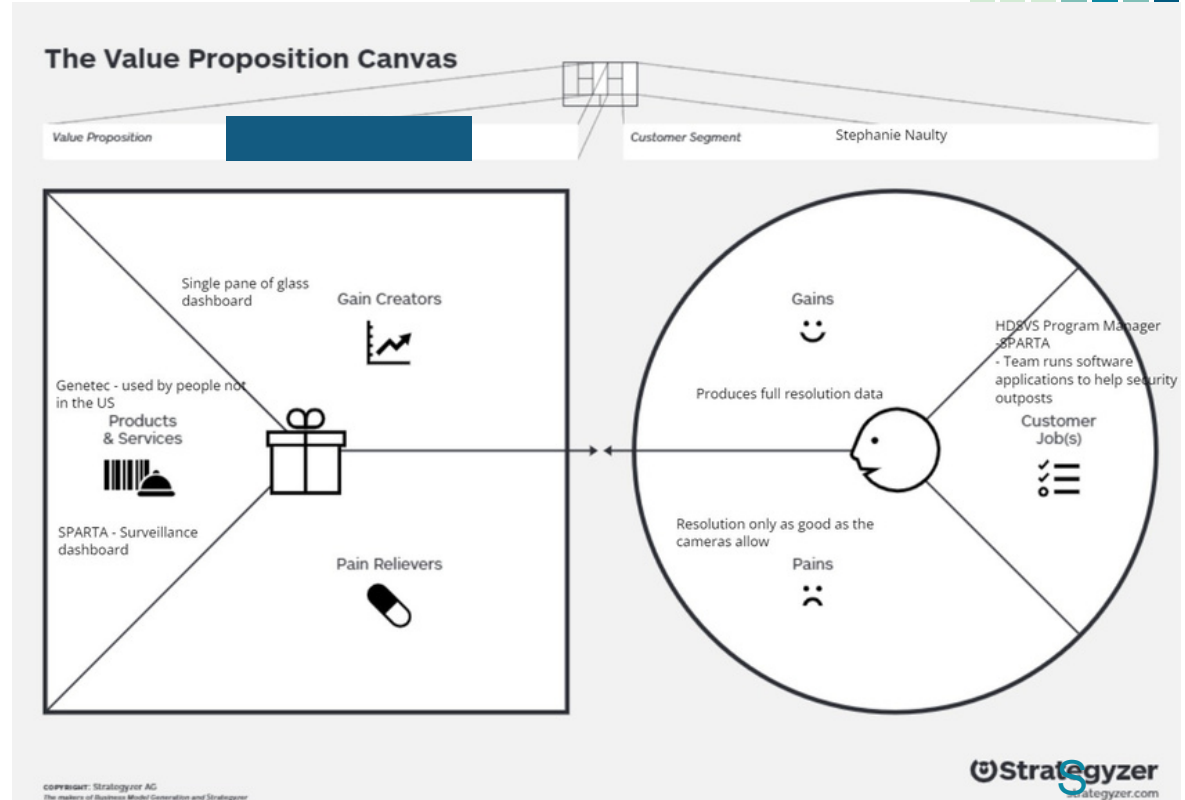
Weeks: 9-10



SPARTA

- Gained more insight into the software that TOG's utilize
- Surveillance dashboard
- Resolution only as good as cameras allow

HDSVS Program Manager



CURRENT STATE SYSTEM



SPARTA – System of Systems



SPARTA Provides A Single Display Of Situational Awareness To Users Around The Globe



The Mission Model Canvas

Mission/Problem Description:

DS-09

Designed by:

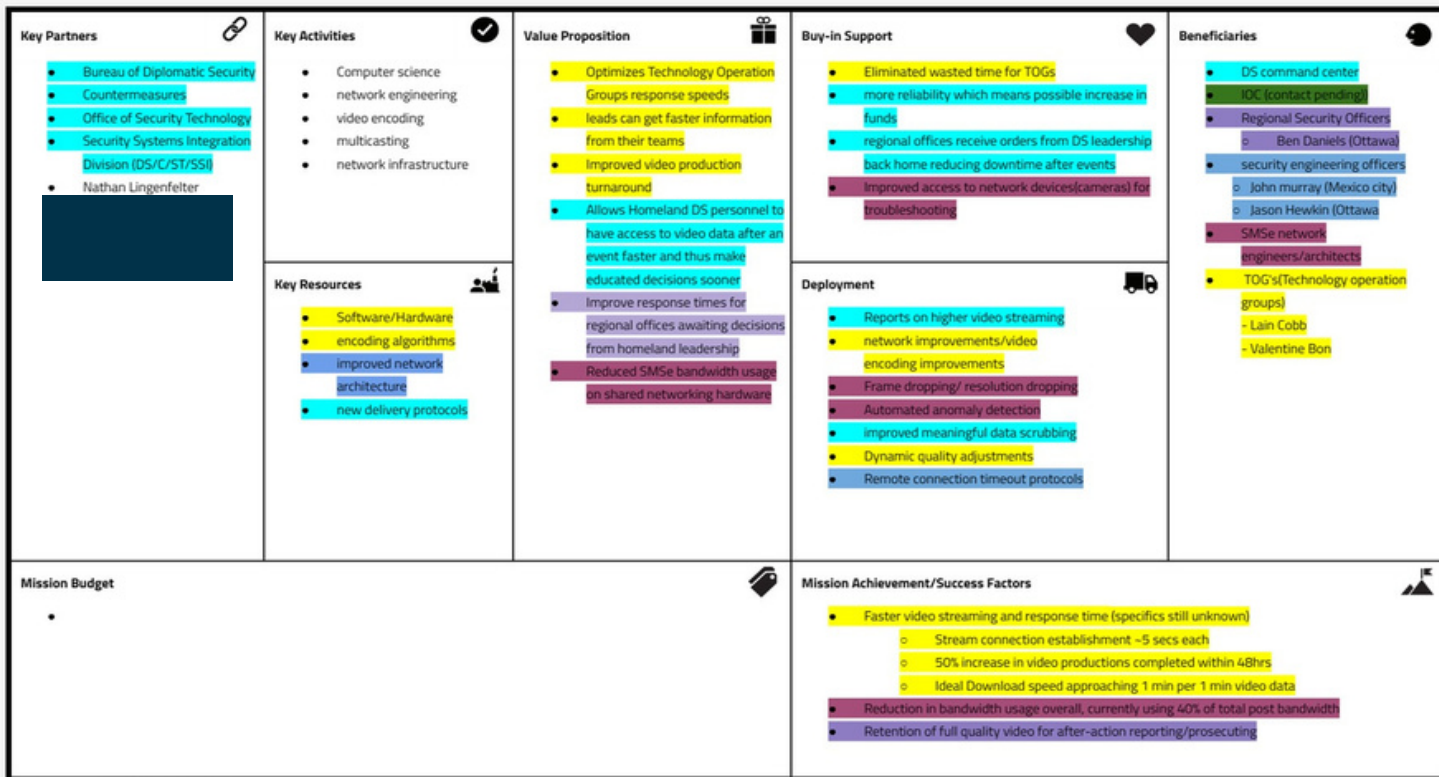
Whole Team

Date

10/31/23

Version

07



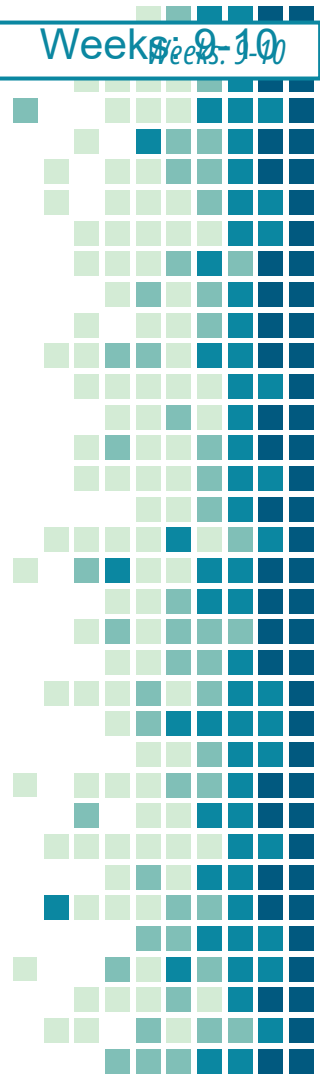
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First Pivot

Technology Operation Groups(TOGs) need prompt access to important video data of interpretable quality from remote sites' surveillance systems across the Western Hemisphere Affairs region in order for DC decisionmakers to form incident response plans. TOGs and regional security staff less promptly require access to high quality video data from these systems to generate post-incident reviews and prosecutions.

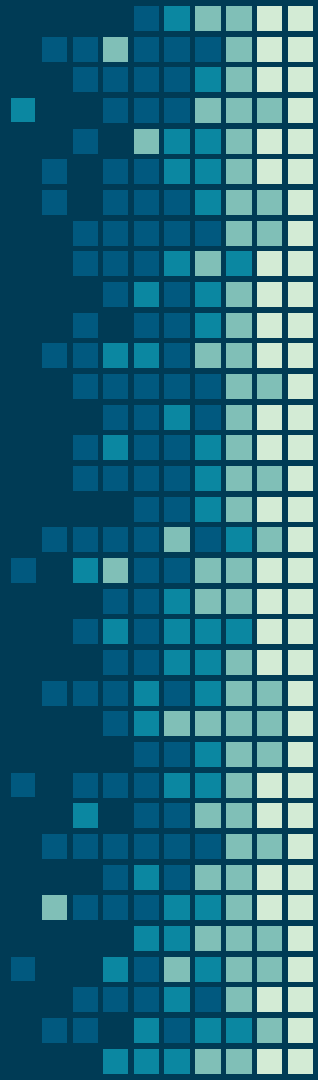
Second Pivot

Technology Operation Groups(TOGs) need prompt access to **flagged** video data of interpretable quality from remote sites ` surveillance systems across the Western Hemisphere Affairs region in order for DC decisionmakers to form incident response plans. Regional security staff less promptly require access to video data from these systems to generate decisions.



WEEKS 11-13: NARROWING IN

Total Completed Interviews: 59

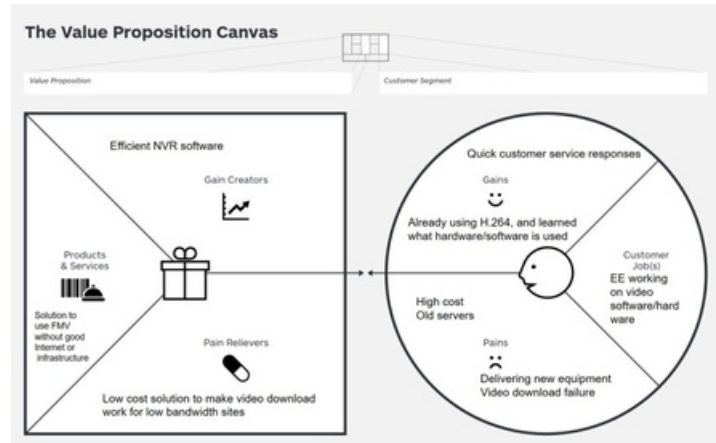


DEFINING THE SOLUTION

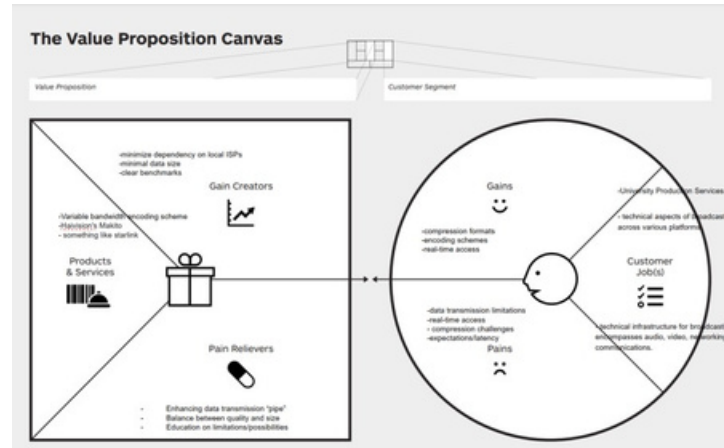
- Too costly to implement hardware
- Compression is done on camera
- 15 FPS to 30FPS; Digital cameras 10-12x more bandwidth

“The solution needs to be network-centric to be cost effective and beneficial overall for the other enterprise applications in use as well.” -SMSe

DOSElectronics Engineer



Sr. Associate Director, Engineering Services

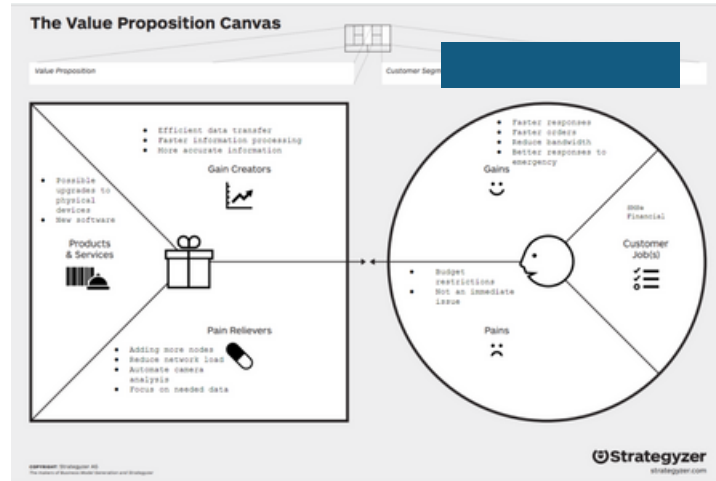


BUDGET

- Cost for implementing at a pilot post
- Network centric solution
- Network infrastructure

“Often we replace equipment when the manufacturer no longer supports them or because they are not capable of performing up to newly implemented standards required by NIST, CISA or other policy setters.”

Finance Department



The Mission Model Canvas

Mission/Problem Description:

DS-09

Designed by:

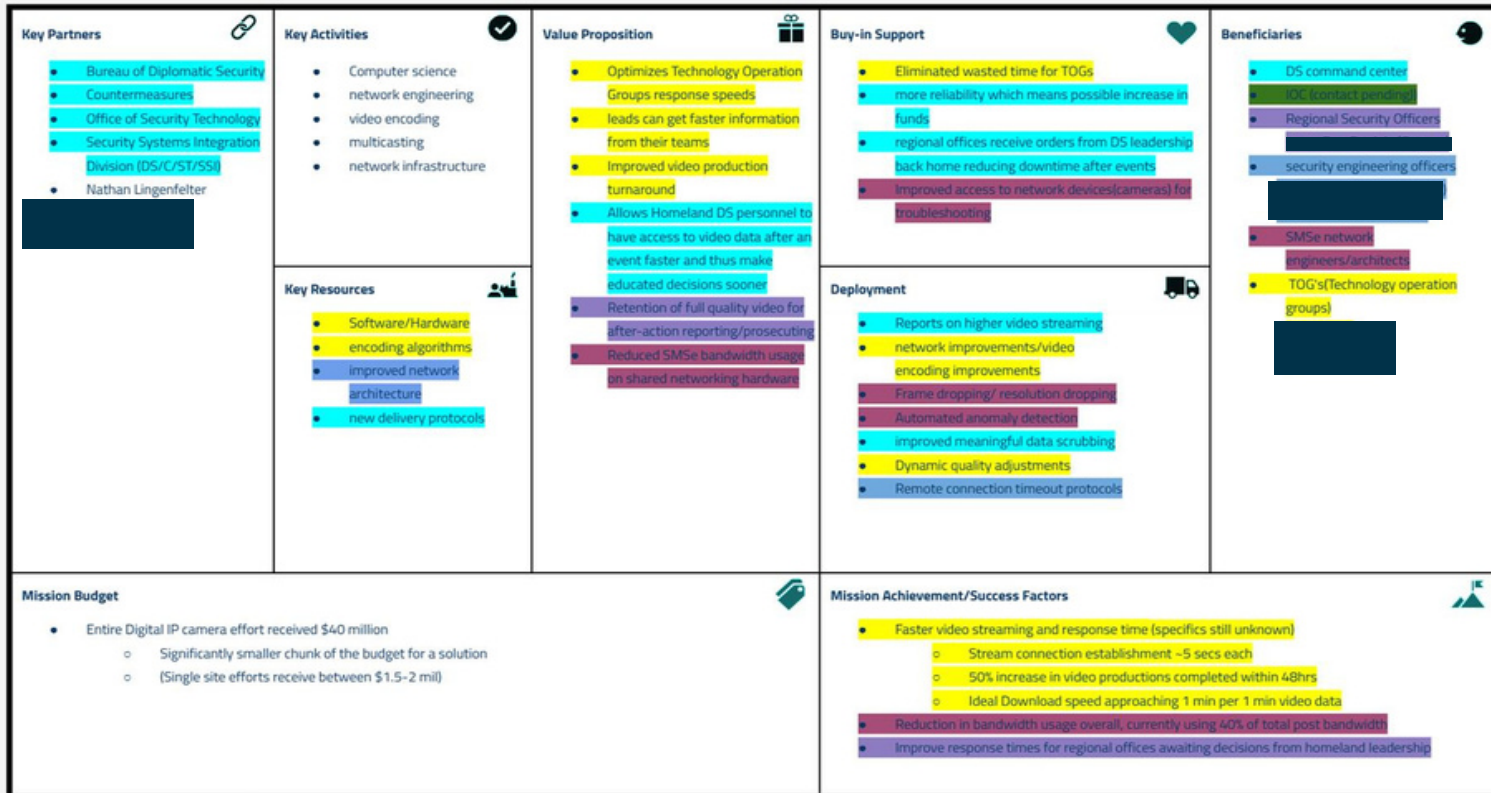
Whole Team

Date

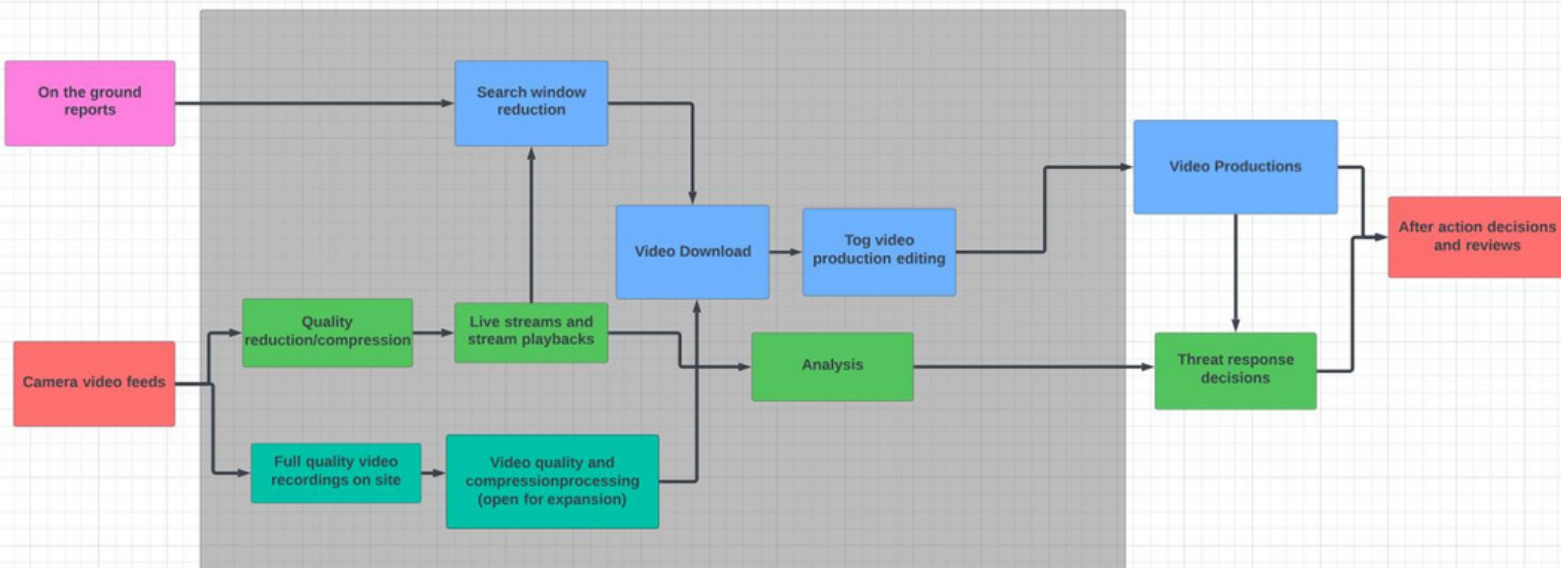
11/14/23

Version

08



WEEK 11 MVP



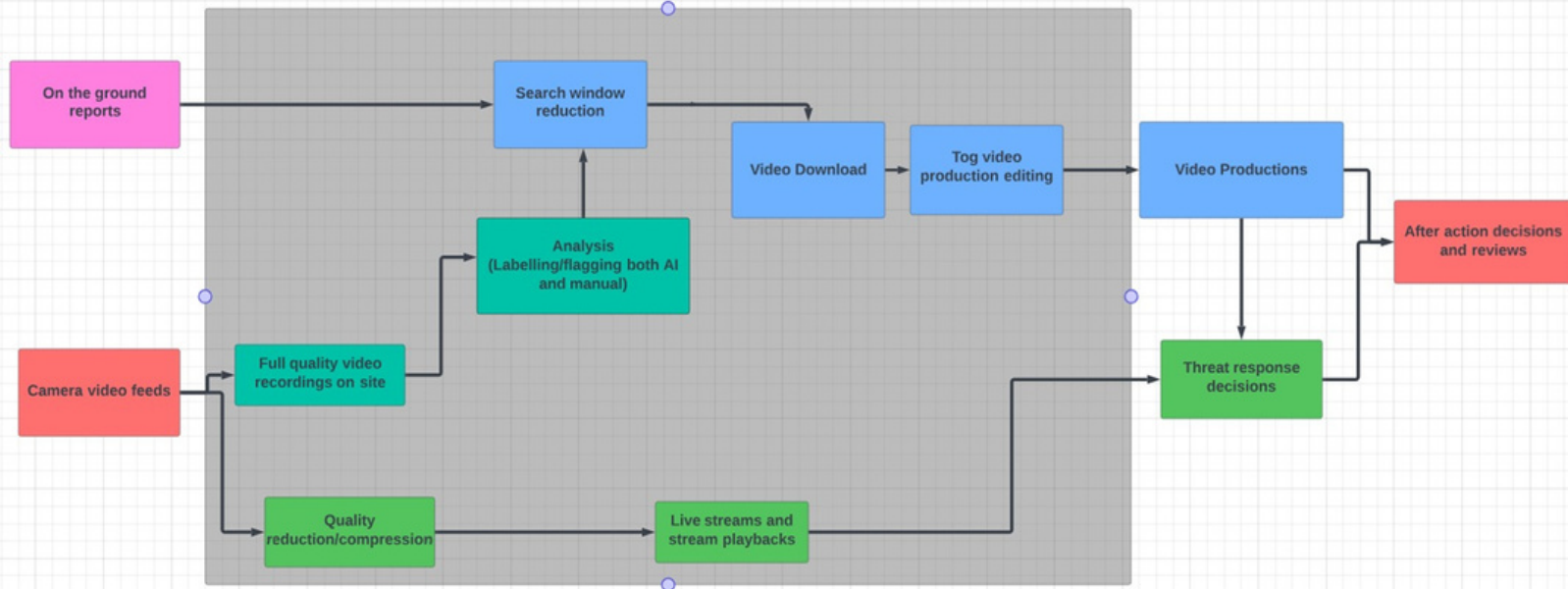
Second Pivot

Technology Operation Groups (TOGs) need prompt access to flagged video data of interpretable quality from remote sites' surveillance systems across the Western Hemisphere Affairs region in order for DC decisionmakers to form incident response plans. Regional security staff less promptly require access to video data from these systems to generate decisions.

Final Pivot

Technology Operation Groups (TOGs) need prompt access (**ideally download speeds reaching 1 minute per every 1 minute of data**) to **needed** video data of interpretable quality from remote sites surveillance systems across the Western Hemisphere Affairs region in order for DC decisionmakers to form incident response plans. **TOGs** and regional security staff less promptly require access to high quality video data from these systems to generate post-incident reviews and prosecutions.

FINALIZED MVP

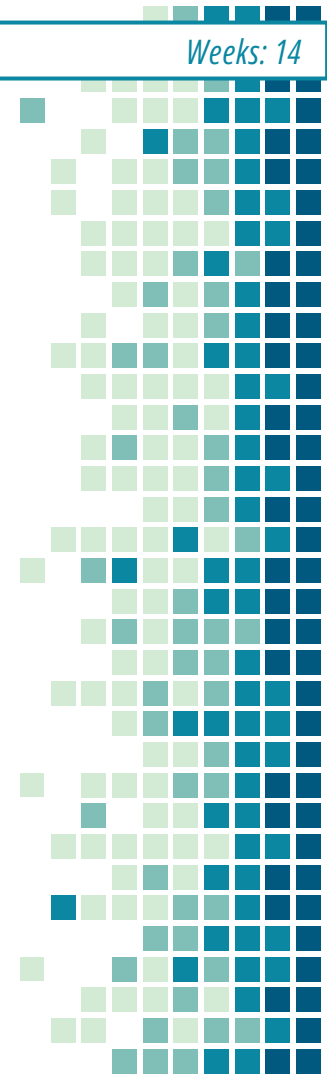


ANALYSIS

- On the ground reports
- Computer Analysis:
 - Anomaly Detection
 - Machine Learning
 - Automated
 - Dive tagging
 - Alerts when it sees a “person” or “vehicle”

SEARCH WINDOW REDUCTION

- On the ground reports
 - Marine Security guards can give details to TOG members
 - Better understanding of events can help narrow down video needed
- Computer Analysis
 - Creation of timestamps with video analysis
 - Metadata and alerts sent to Command Centers
 - Labeled timestamps and alerts can help narrow down video needed



The Mission Model Canvas

Mission/Problem Description:

DS-09

Designed by:










Whole Team

Date

11/28/23

Version

10

<p>Key Partners </p> <ul style="list-style-type: none"> Bureau of Diplomatic Security Countermeasures Office of Security Technology Security Systems Integration Division (DS/C/ST/SSI) Nathan Linpenfelter [Redacted] [Redacted] 	<p>Key Activities </p> <ul style="list-style-type: none"> Computer science network engineering video encoding multicasting network infrastructure <p>Key Resources </p> <ul style="list-style-type: none"> Software/Hardware encoding algorithms improved network architecture new delivery protocols 	<p>Value Proposition </p> <ul style="list-style-type: none"> Optimizes Technology Operation Groups response speeds leads can get faster information from their teams Improved video production turnaround Allows Homeland DS personnel to have access to video data after an event faster and thus make educated decisions sooner Retention of full quality video for after-action reporting/prosecuting Reduced SMSe bandwidth usage on shared networking hardware 	<p>Buy-in Support </p> <ul style="list-style-type: none"> Eliminated wasted time for TOGs more reliability which means possible increase in funds regional offices receive orders from DS leadership back home reducing downtime after events Improved access to network devices/cameras for troubleshooting <p>Deployment </p> <ul style="list-style-type: none"> Reports on higher video streaming network improvements/video encoding improvements Frame dropping/ resolution dropping Automated content detection <ul style="list-style-type: none"> Integrate video analytics/anomaly detection into ip camera installation project improved meaningful data scrubbing Dynamic quality adjustments Remote connection timeout protocols 	<p>Beneficiaries </p> <ul style="list-style-type: none"> DS command center IDC (on contract pending) Regional Security Officers [Redacted] security engineering officers [Redacted] SMSe network engineers/architects TOG's (Technology operation groups) [Redacted]
<p>Mission Budget </p> <ul style="list-style-type: none"> Procurement: Entire Digital IP camera effort received \$40 million <ul style="list-style-type: none"> Significantly smaller chunk of the budget for a solution (Single site efforts receive between \$1.5-2 mil) RDT&E: NSM spent a total of \$3.7M in FY23. <ul style="list-style-type: none"> Licensing: \$2.6M Software: \$239K Maintenance: \$921K 		<p>Mission Achievement/Success Factors </p> <ul style="list-style-type: none"> Faster video streaming and response time (specifics still unknown) <ul style="list-style-type: none"> Stream connection establishment ~5 secs each 50% increase in video productions completed within 48hrs Ideal Download speed approaching 1 min per 1 min video data Reduction in bandwidth usage overall, currently using 40% of total post bandwidth Improve response times for regional offices awaiting decisions from homeland leadership 		



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SPECIAL THANKS TO:

All the lovely people who took time out of their lives to let us
interview them

THANKS!

Any questions?

