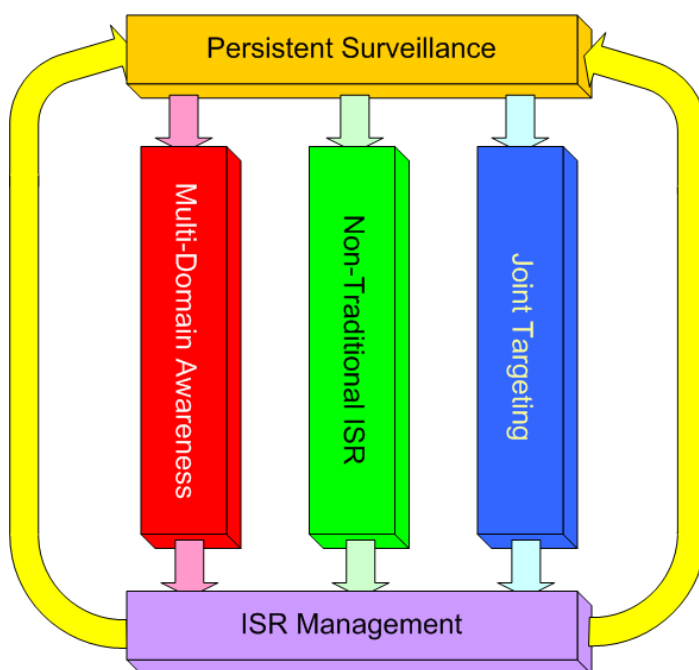




Empire Challenge 08

Use Case Exposition



Version:	6.5
Created:	5 November 2007
Last Update:	5 November 2007
Print Date:	5 November 2007
By:	Tim Eveleigh
Distribution:	Unlimited

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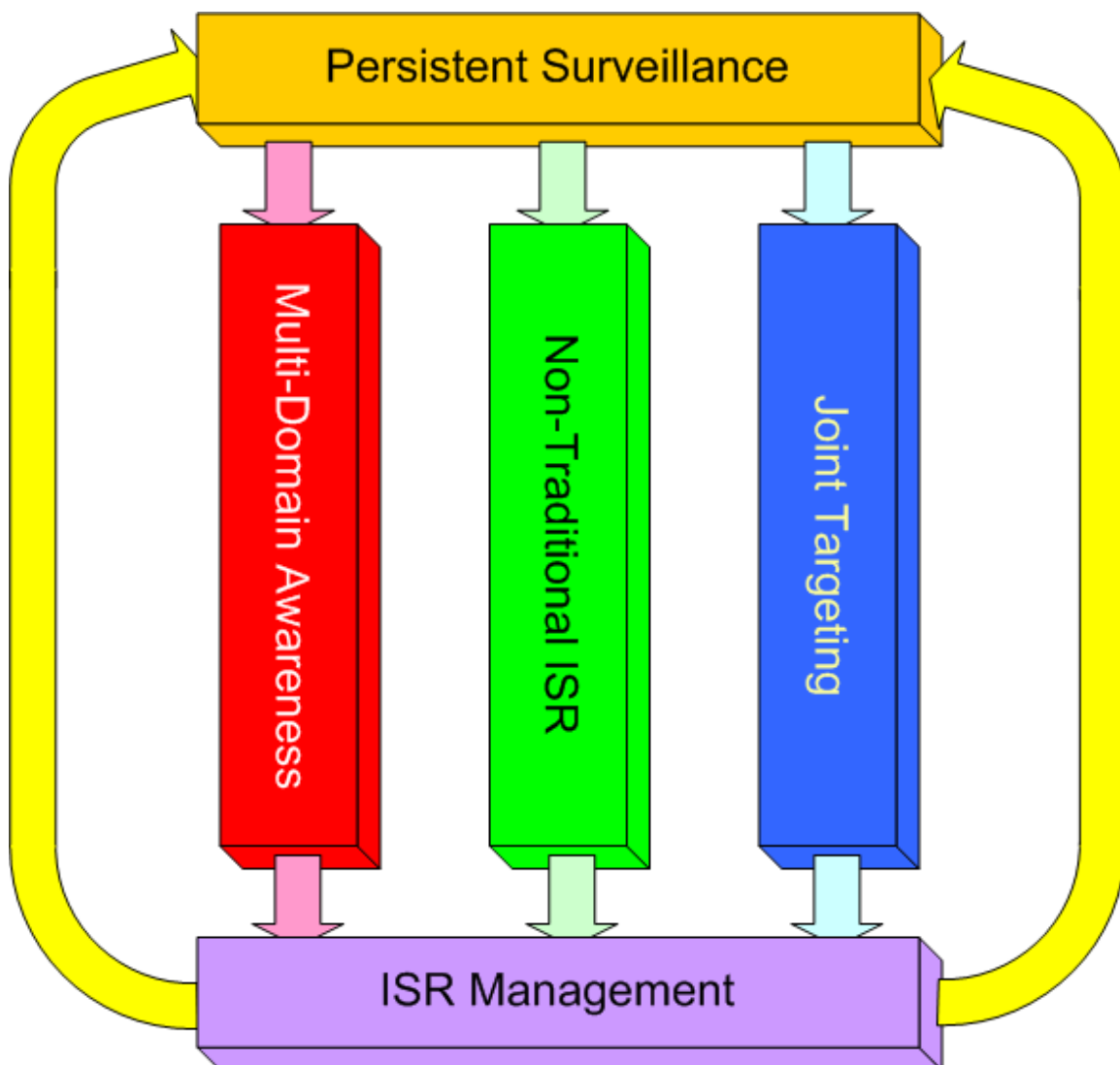
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1 Introduction

Empire Challenge (EC) affords the GEOINT community a valuable means to experiment with and validate promising technologies that have the potential to enrich and empower coalition C4ISR enterprises. EC08, scheduled for the summer of 2008 will feature a strong focus on integrated Intelligence Surveillance and Reconnaissance (ISR) operations in support of joint targeting, non-traditional ISR (NT-ISR), and multi-domain awareness (MDA). EC08 will also stress coalition information sharing, the growing role of Network Centric Enterprise Services (NCES), the dynamics of persistent surveillance, and a functional assessment of the family of Distributed Common Ground Stations (DCGS).

The figure below depicts the notional fabric of EC08's five joint mission threads (JMTs).



The EC08 JMTs serve to administratively partition EC08 exercise planning and draw attention toward key capabilities that will play roles and thus be assessed in the course of the exercise.

While appearing distinct, functionally the JMTs are parts of a larger operational cycle that includes persistent surveillance to maintain multi-domain awareness and that must scale to meet the more cyclical demands of joint targeting and NT-ISR (essentially time-sensitive strike). The balance between the needs of surveillance/awareness and targeting operations requires agile and dynamic ISR management. For this reason, we have selected use cases associated with ISR support to targeting so as to be sure that all five JMTs are explored.

This document elaborates a set of use cases that describe activities associated with assisting targeting operations with ISR. In particular, we stress full motion video (FMV) as it is expected to figure prominently in the EC08 sensor architecture, supports (or is supported by) all five JMTs, and represents a dynamic that has not been fully 'bedded-down' and integrated with the greater C4ISR enterprise that is characterized by distributed, multinational and commercial players operating within enclaves of differing security levels. We chose this set of use cases as it leverages each of the JMTs in some way and represents a logical, sequential means to expose the core activities we expect to see performed during the EC08 evolution.

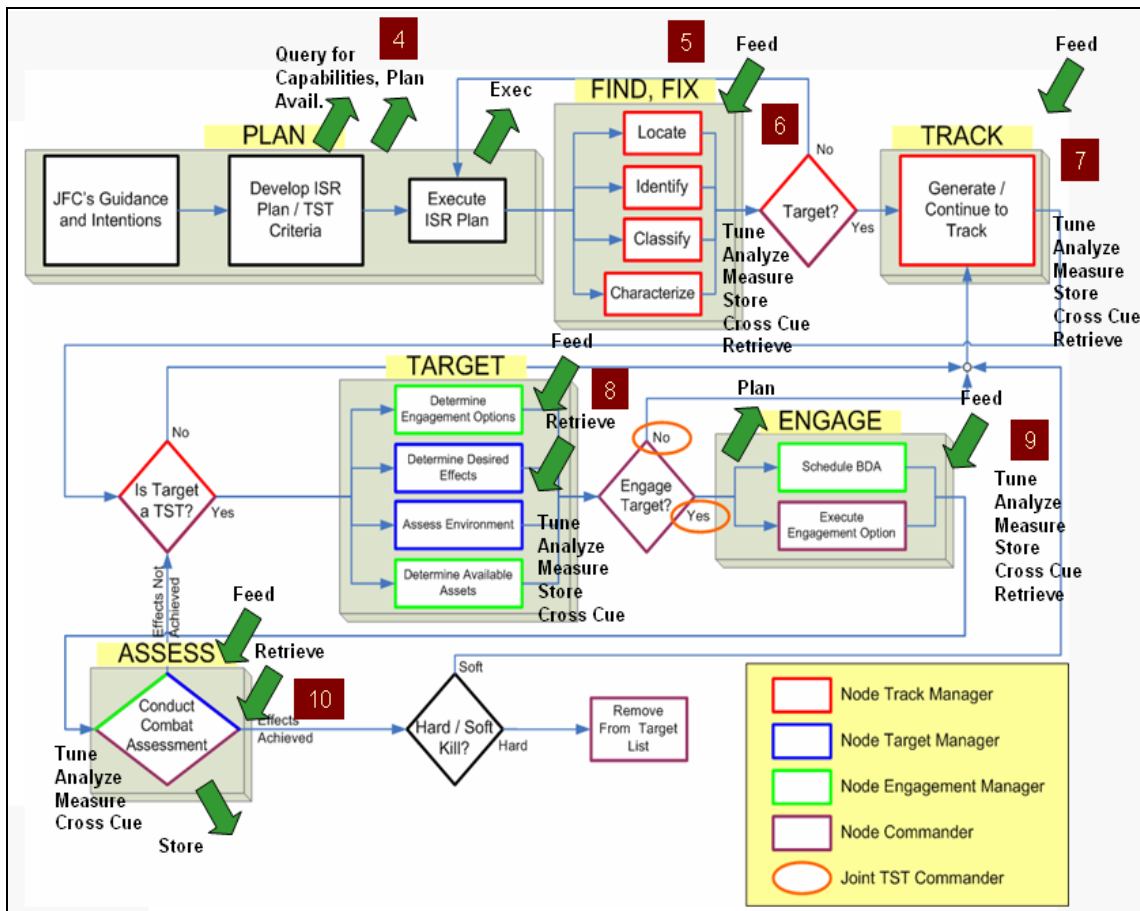
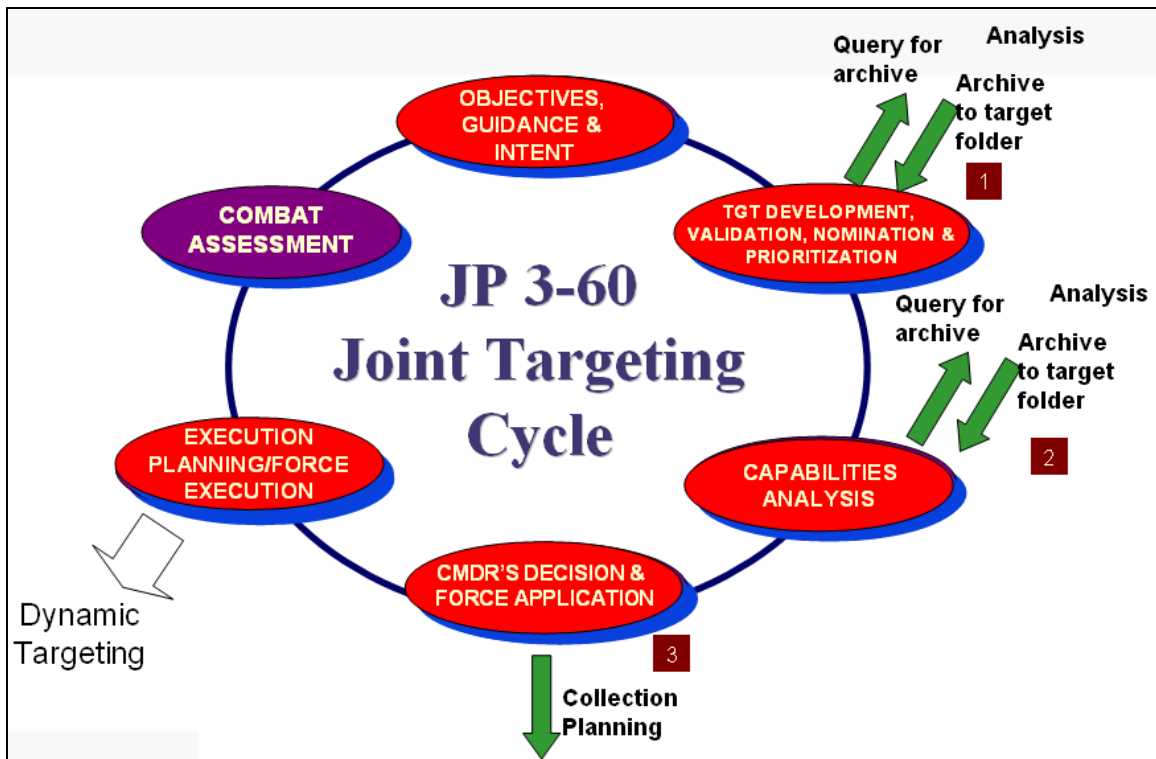
1.1 Purpose of Document

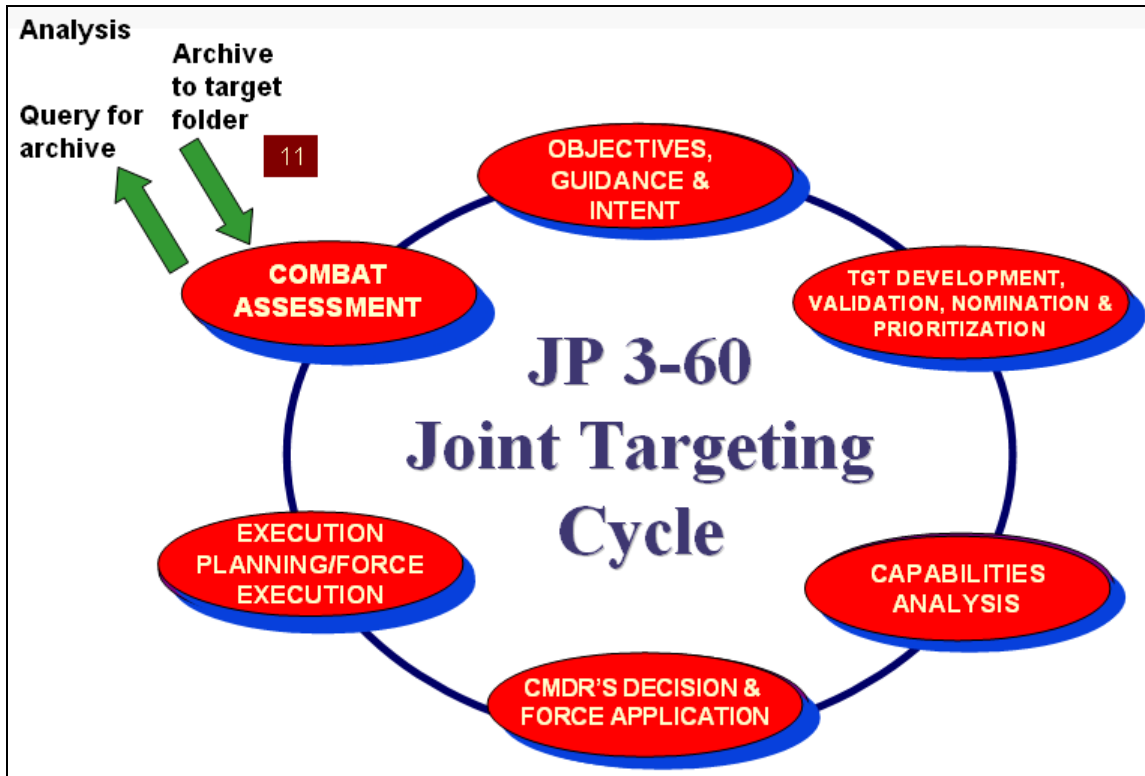
The Purpose of this Document is to express and elaborate the various use cases associated with FMV in support of targeting operations as a means to explore high leverage opportunities to validate open geospatial technologies and standards in EC08.

In expressing these use cases, we identify actors, interactions, scenarios, and assumptions useful for characterizing how open geospatial standards and technologies can enable future coalition ISR enterprises, particularly those that are introducing the varied roles of FMV assets. The use cases are derived from the Joint Publication 3-60 (JP 3-60, Joint Targeting) "Targeting Cycle" and the "Find Fix Track Target Engage Assess" (F2T2EA) time-sensitive targeting process model adopted by the Force Applications Functional Capabilities Board (FA FCB). The use cases are broken into families that suggest roles for FMV from phases in each of these two cycles. We also suggest some architectural use cases that deal more with perturbations common to an ISR enterprise, notably, the introduction of new resources, and the distribution of ISR resources across security domains, international partners, corporations, and the globe. Finally, we crosswalk the use cases with the five EC08 JMTs in order to relate the atomic activities in the use cases to the broader themes underpinning the exercise. In summary, these use cases are a means to expose potential areas for experimentation and investment in open geospatial capabilities that will both strengthen the ISR enterprise and make it more flexible.

1.2 Mission Context

The following figures illustrate the JP 3-60 Joint Targeting Process Model and the FA FCB's high level process flow model for the F2T2EA "cycle" for time-sensitive targeting. Superimposed on these figures are most the use case families presented in this document.





During EC08, we expect that many of the joint targeting JMT activities will be exercised at the Joint Systems Integration Center (JSIC) as part of the coincident Joint Systems Baseline Assessment (JSBA 08). Consequently, we have placed more focus on the time-sensitive targeting cycle that moderates the NT-ISR JMT.

Use Cases

2 Use Case Model

Figure 1 depicts the structure of the EC08 OGC use case package structure.

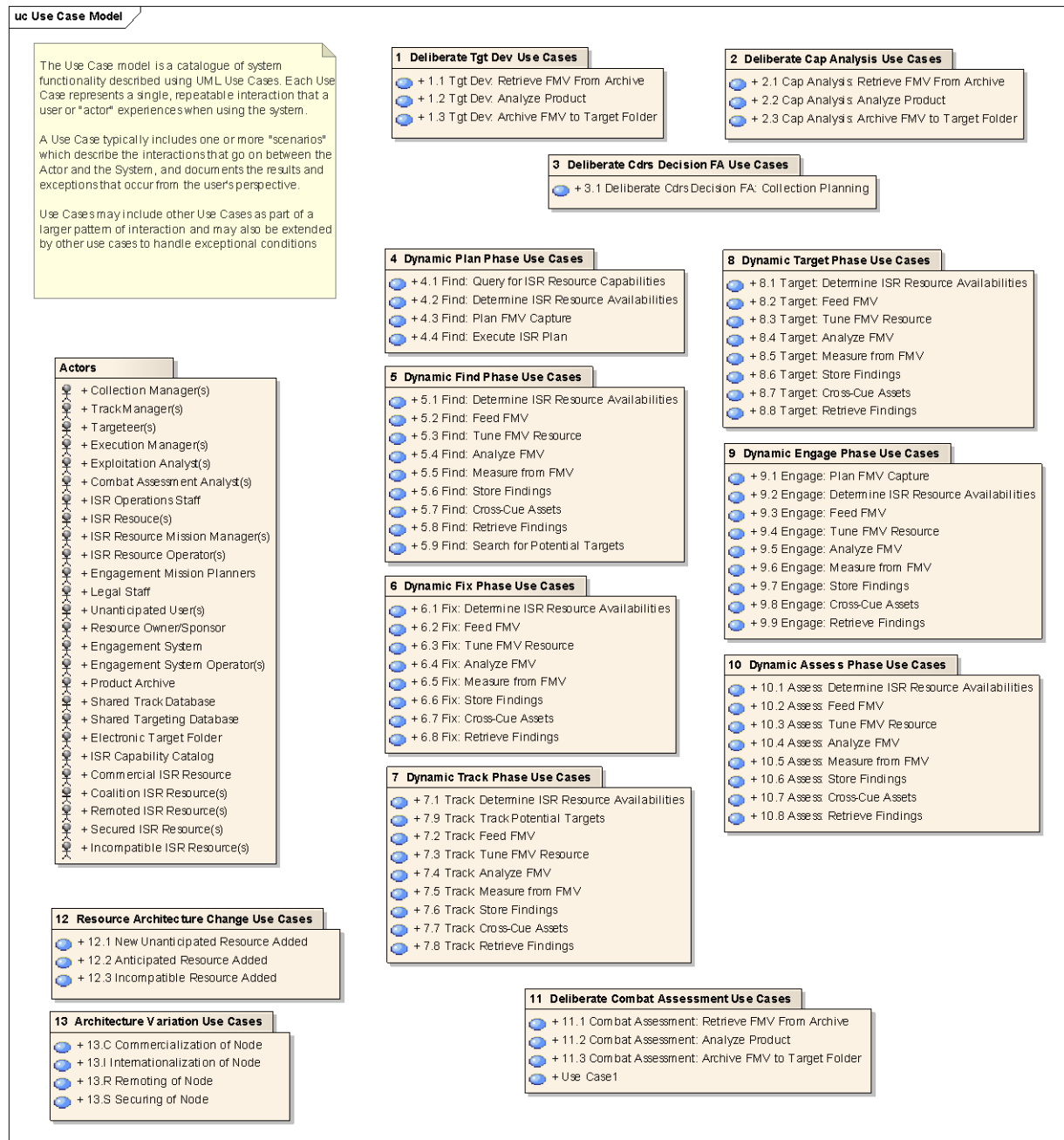


Figure 1: Use Case Model

2.1 Note

The Use Case model is a catalogue of system functionality described using UML Use Cases. Each Use Case represents a single, repeatable interaction that a user or "actor" experiences when using the system.

A Use Case typically includes one or more "scenarios" which describe the interactions that go on between the Actor and the System, and documents the results and exceptions that occur from the user's perspective.

Use Cases may include other Use Cases as part of a larger pattern of interaction and may also be extended by other use cases to handle exceptional conditions

2.2 Actors

2.2.1 Collection Manager(s)

Collection Managers are assigned to assist users with acquiring ISR products for analysis and exploitation. They are considered the user gateway to the ISR enterprise and have access to a wealth of knowledge on sensor operations and capabilities. CMs may have purview and tasking nomination rights over theater organic or national assets.

2.2.2 Track Manager(s)

The Track Manager is responsible for managing and performing the process of locating potential targets and holding them in a tracked state. This concerns attempting to identify, classify, characterize, and maintain the location of possible targets. Track managers participate in TST operations planning as SMEs on expected track locations and probable velocity vectors. Track Managers also must maintain a strong awareness of blue and grey forces, movement controls, lines of communication, and the results of intelligence preparation of the battlespace.

2.2.3 Targeteer(s)

These individuals are responsible for determining whether tracks are actually considered time-sensitive targets, the selection of appropriate effects to bring to the target, the development and correlation of tracks with intelligence sources, and vetting targets through a validation process. This assures that targets are valid and legally engageable and that collateral damage considerations are explored. Targeteers also participate in the combat assessment activity.

2.2.4 Execution Manager(s)

The TST Execution Manager manages the TST execution for the TST Cell.

Typically this is an operations officer who is in direct contact with the strike platform, weapons system operators, or AWACS. The Execution Manager must ensure that all coordination steps have been taken and that the engaged target meets the JFC's definition of a TST and that the rules of engagement are met.

2.2.5 Exploitation Analyst(s)

Exploitation analysts are trained to read out sensor products such as FMV as well as perform enhancement functions, mensuration, product annotation and capture, and reporting. In many cases they can also operate/control their ISR resources. In other cases, the Track Manager is also an exploitation analyst.

2.2.6 Combat Assessment Analyst(s)

Analysts assigned to perform combat assessment activities, typically Phase 1 (physical), Phase 2 (functional), and sometimes Phase 3 (target system) damage assessment. The majority of these analysts are on combatant command or agency combat assessment teams.

2.2.7 ISR Operations Staff

ISR Operations Staff are usually a functional team that assists the TST cell with ISR integration into the targeting process. In this capacity they can perform analytical, planning, and liaison roles. This team is especially useful during high time tempo operations, operations with resource contention, and when manned ISR resources are in play.

2.2.8 ISR Resource(s)

These are the actual FMV resources which include the sensor systems, sensor platform, comms/downlink, distribution architecture, and processing, exploitation, and dissemination resources. In the case of several FMV systems, this also includes space-based reachback capabilities.

2.2.9 ISR Resource Mission Manager(s)

ISR Mission Managers are sometimes used to consolidate platform operations for particular multimode ISR resources. These can be implemented by humans or machines and are often needed to optimize and broker the use of an in-demand asset.

2.2.10 ISR Resource Operator(s)

Some ISR resources have human operators that control sensor and/or platform operations. These can be local to the TST cell or remoted to a platform or to reachback. In some cases responsibility for platform and for sensor operations may be assigned to different operators.

2.2.11 Engagement Mission Planners

Engagement Mission Planners plan missions for engagement assets such as strike aircraft. These planners generally review targeting materials to include FMV to better understand the target and its environment. They may also use these products to brief weapon/platform operators and construct mission rehearsal materials.

2.2.12 Legal Staff

Legal staff can become engaged at multiple command levels during the targeting, engagement, and assessment processes, usually to approve recommended effects or weapon use to ensure they are consistent with the law of armed conflict (LOAC) and rules of engagement (LOE).

2.2.13 Unanticipated User(s)

Everyone else who believes they have a stake in the TST process or who is given a stake at a later date or who uses TST information for other purposes.

2.2.14 Resource Owner/Sponsor

This actor is a proxy for the owner or sponsor of an ISR resource and as such represents its capabilities and can make command decisions over its use.

2.2.15 Engagement System

The Engagement System is the system selected to cause an effect on a target. Typically this is a weapon system which might even be present on an ISR resource (such as Hellfire).

2.2.16 Engagement System Operator(s)

Engagement system operators control some engagement systems used to bring effects to targets. These may be collocated with ISR operations, remoted, or en route.

2.2.17 Product Archive

A product archive is a physical node in the enterprise that is capable of storing and cataloging FMV products and feeds.

2.2.18 Shared Track Database

A shared track database is typically the repository for track information developed and maintained by the Track Managers. This database might be a local asset or shared with a broader community and may support a track gateway to a broader network of tracking capabilities.

2.2.19 Shared Targeting Database

This shared (and usually replicated) database serves as the single repository for authoritative targeting data. Typical contents include: targets, aimpoints, desired effects, weapon/effect solutions, objectives, no strike lists, restricted target lists, joint target lists, combat assessment calls, collateral damage concerns, analyst comments, and references to related products.

2.2.20 Electronic Target Folder

The Electronic Target Folder or ETF is a repository that targeteers use to save products like FMV clips and imagery (or references to these) associated with particular targets. This information typically supplements structured intelligence kept in the shared targeting database.

2.2.21 ISR Capability Catalog

An ISR Resource Capability Catalog would retain capability information on ISR resources that can be used by enterprise clients and collection managers to determine what specific ISR resources are able to do.

2.2.22 Commercial ISR Resource

This represents an ISR functional node that is operated by a commercial party.

2.2.23 Coalition ISR Resource(s)

These would represent ISR resources (CPED platforms, equipment, personnel) that belong to a foreign entity that is supporting the ISR enterprise.

2.2.24 Remoted ISR Resource(s)

This actor represents an ISR resource (node) that has been physically removed from the majority of resources. This could include any CPED assets and/or personnel as is often the case with reachback or forward deployment.

2.2.25 Secured ISR Resource(s)

This represents an ISR resource that is operating in a security enclave that is higher than that of functional nodes it supports.

2.2.26 Incompatible ISR Resource(s)

This actor is an ISR resource that is in some or all ways incompatible with the greater ISR enterprise. Incompatibilities might include non-standard, collection, tasking, product, or capabilities inventory assessment interfaces.

2.3 1 Deliberate Tgt Dev Use Cases

Target development entails the systematic examination of potential target systems (their components, individual targets, and target elements) to determine the necessary type and duration of action that must be exerted on each target to create the required effect(s) consistent with the commander's objectives.

- (a) Once potential target systems are matched against the commander's objectives, the next step is to conduct a Target System Analysis. TSA identifies critical components or nodes of a target system, which are generally used as a base line for target selection.
- (b) Target vetting and validation determine whether a target remains a viable element of the target system, and whether it is a lawful target under LOAC and ROE. In this process, the potential benefit of striking a target is weighed against the potential costs.
- (c) Once potential targets are identified, vetted, and validated, they are nominated, through the proper channels, for approval. Targets are prioritized based on the JFC's guidance and intent.
- (d) The target development process will generate several products and lists as it progresses, but the end product supports the succeeding steps of the joint targeting cycle.

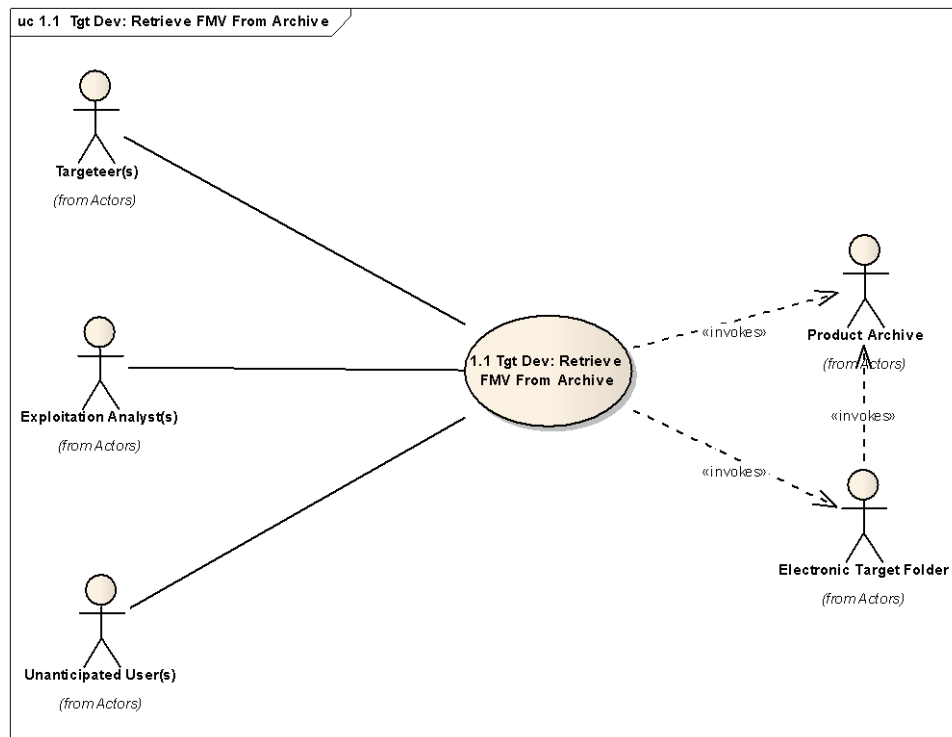


Figure 2: 1.1 Tgt Dev: Retrieve FMV From Archive

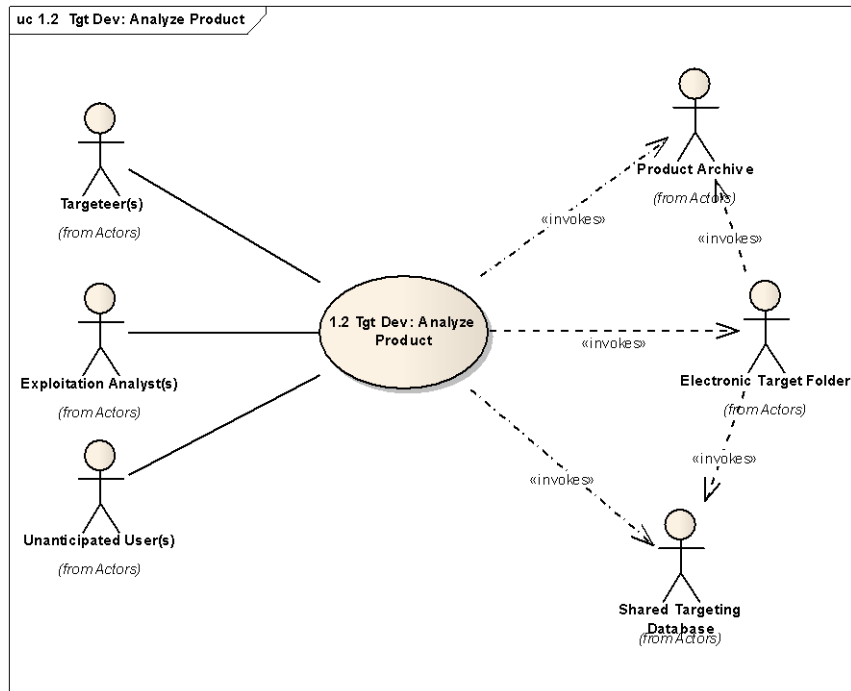


Figure 3: 1.2 Tgt Dev: Analyze Product

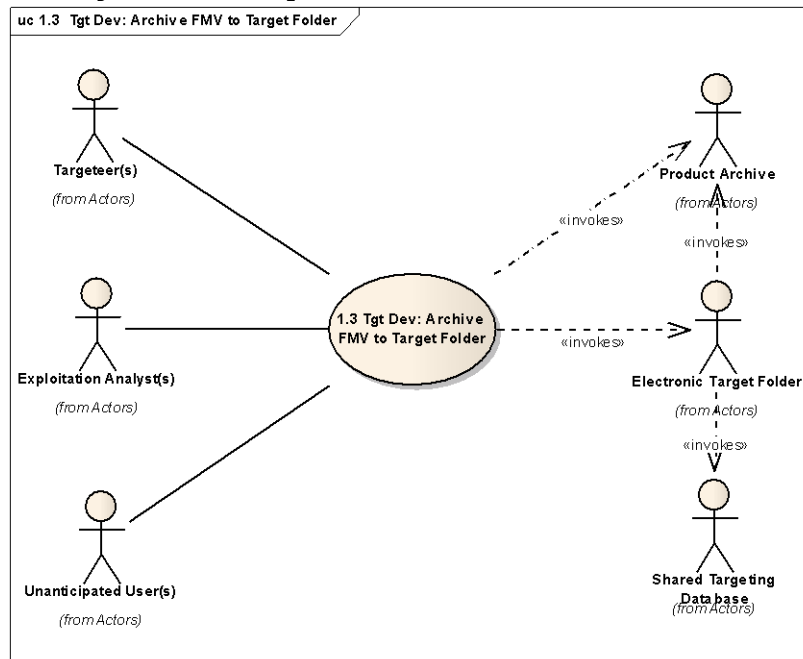


Figure 4: 1.3 Tgt Dev: Archive FMV to Target Folder

2.3.1 1.1 Tgt Dev: Retrieve FMV From Archive

Find any FMV that might contribute to the target elopement task. This could be of fixed or mobile targets and might include weapons system video. Search might be for a particular target area, search box, or designated area.

Flow of Events

Basic Path

Typical

1. Query target folder or archive catalog for FMV of target or target location
2. Pull FMV files at location

Alternate

EC08 JMT

1. Supports Joint Targeting

Pre-condition

Status: Approved

FMV exists in archive

Some amount of FMV exists for target being assessed.

Process

Status: Approved

FMV can be retrieved

If longhaul comms are involved or extensive security bridges, FMV products might not be practically retrievable

2.3.2 1.2 Tgt Dev: Analyze Product

Analyze FMV product for any evidence of targets. Target development staff performing target development and target materials compilation analyze FMV products. Analysis might reveal new targets, no-strike items, damage etc.

Flow of Events

Basic Path

Typical

1. View FMV product
2. Make subproducts or frame shots
3. Place in target folder

Alternate

EC08 JMT

1. Supports Joint Targeting

2.3.3 1.3 Tgt Dev: Archive FMV to Target Folder

Save segments or entire FMV product to target folder or annotated frames to product archive. If FMV is found relevant to target knowledge, it could be "saved" in an electronic target folder

Flow of Events

Basic Path

Typical

1. Select products and/or sub-products to save
2. Designate place to store

3. Store products there

Alternate

EC08 JMT

1. Supports Joint Targeting

Pre-condition

Status: Approved

Permissions

Permissions must permit updating the target folders, archive, and/or shared database.

2.4 2 Deliberate Cap Analysis Use Cases

This phase of the joint targeting cycle involves evaluating available capabilities against desired effects to determine the appropriate options available to the commander. Its purpose is to weigh the relative effectiveness and efficiency of the available forces as an aid to achieving the objectives set forth by the JFC and subordinate commanders. Commanders also consider risks to the force and collateral concerns in evaluating available capabilities. Estimates of required weapons or capabilities shape other planning considerations within the joint force.

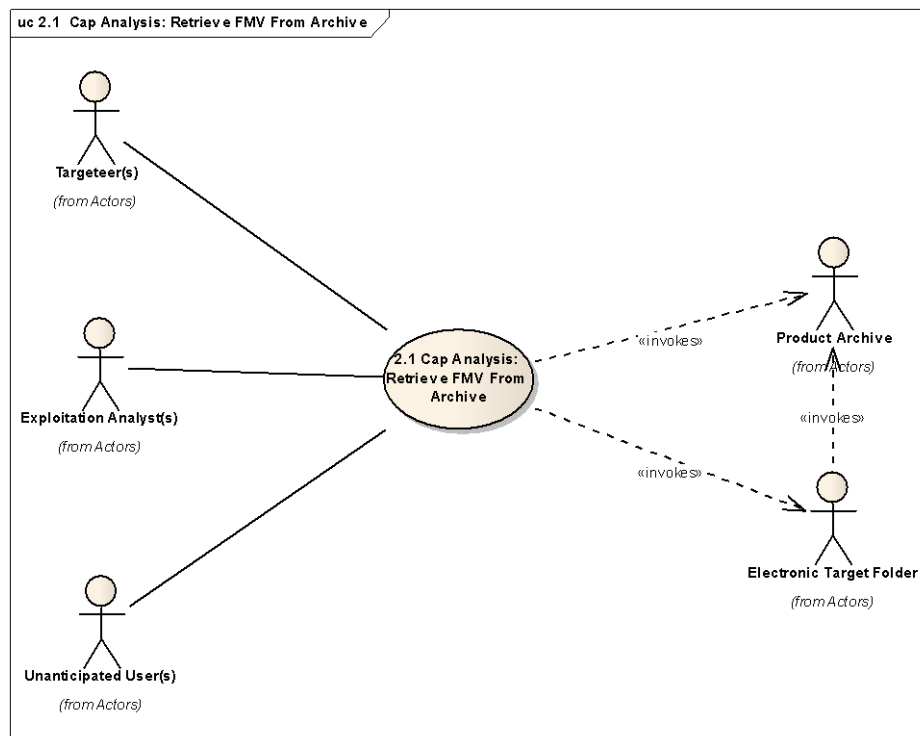


Figure 5: 2.1 Cap Analysis: Retrieve FMV From Archive

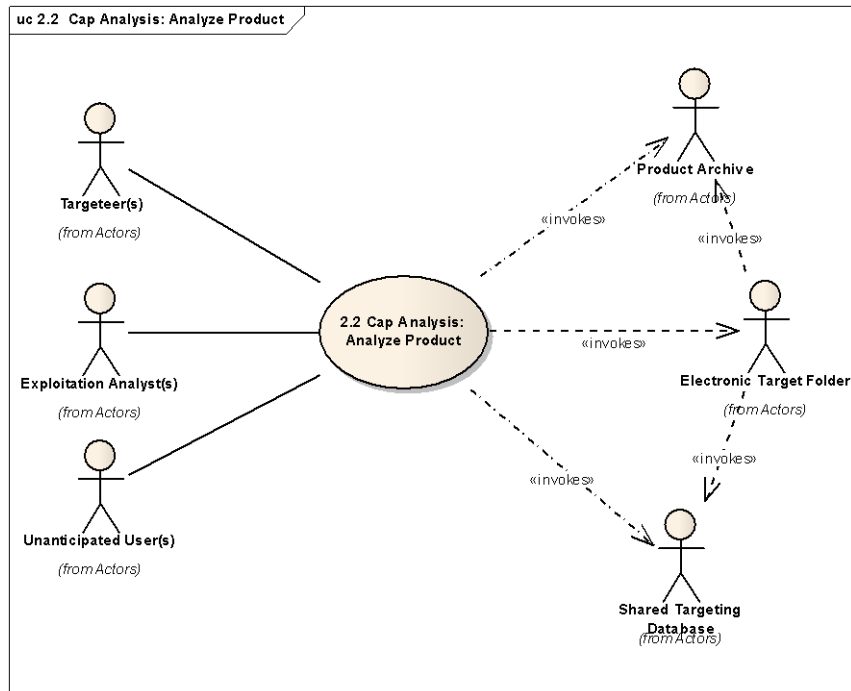


Figure 6: 2.2 Cap Analysis: Analyze Product

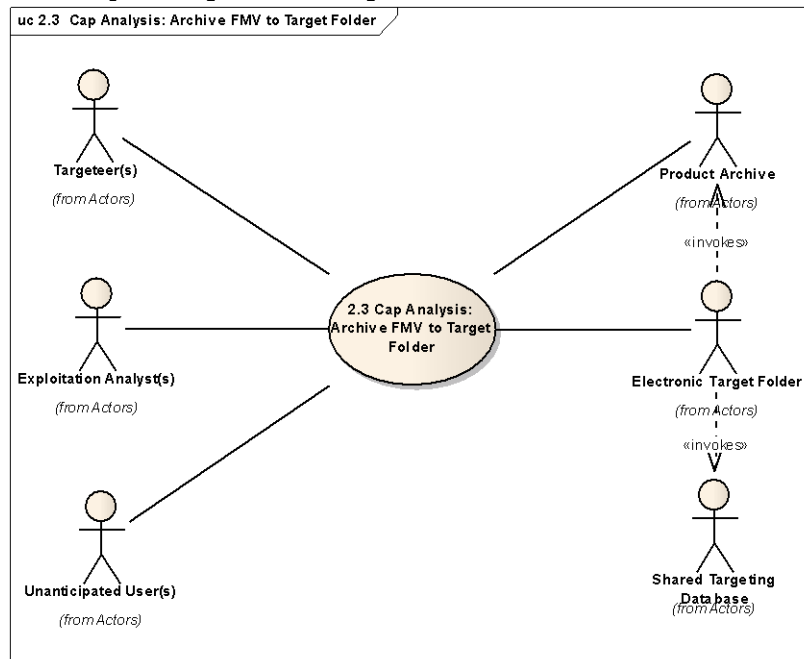


Figure 7: 2.3 Cap Analysis: Archive FMV to Target Folder

2.4.1 2.1 Cap Analysis: Retrieve FMV From Archive

Find any FMV that might contribute to the capability analysis tasks. This would support target development staff performing collateral damage estimation. Search would likely be for all FMV relative to a target/point/footprint.

Flow of Events

Basic Path

Typical

1. Query target folder or archive catalog for FMV of target or target location
2. Pull FMV files at location

Alternate

EC08 JMT

1. Supports Joint Targeting

Pre-condition

Status: Approved

FMV exists in archive

Some amount of FMV exists for target being assessed.

Process

Status: Approved

FMV can be retrieved

If longhaul comms are involved or extensive security bridges, FMV products might not be practically retrievable

2.4.2 2.2 Cap Analysis: Analyze Product

Analyze FMV product for any evidence of targets. Target development staff performing target development and target materials compilation analyze FMV products. Analysis might reveal new targets, no-strike items, CDE concerns, damage etc.

Flow of Events

Basic Path

Typical

1. View FMV product
2. Make subproducts or frame shots
3. Place in target folder

Alternate

EC08 JMT

1. Supports Joint Targeting

2.4.3 2.3 Cap Analysis: Archive FMV to Target Folder

Save segments or entire FMV product to target folder or annotated frames to product archive. If FMV is found relevant to capabilities assessment, it should be "saved" in an electronic target folder

Flow of Events

Basic Path

Typical

1. Select products and/or sub-products to save

2. Designate place to store
3. Store products there

Alternate

EC08 JMT

1. Supports Joint Targeting

Pre-condition

Status: Approved

Permissions

Permissions must permit updating the target folders, archive, and/or shared database.

2.5 3 Deliberate Cdrs Decision FA Use Cases

Once the JFC has approved the Joint Integrated Prioritized Target List, either entirely or in part, tasking orders are prepared and released to the executing components and forces. The joint targeting process facilitates the publication of tasking orders by providing amplifying information necessary for detailed force-level planning of operations. Significant ISR activities are planned here.

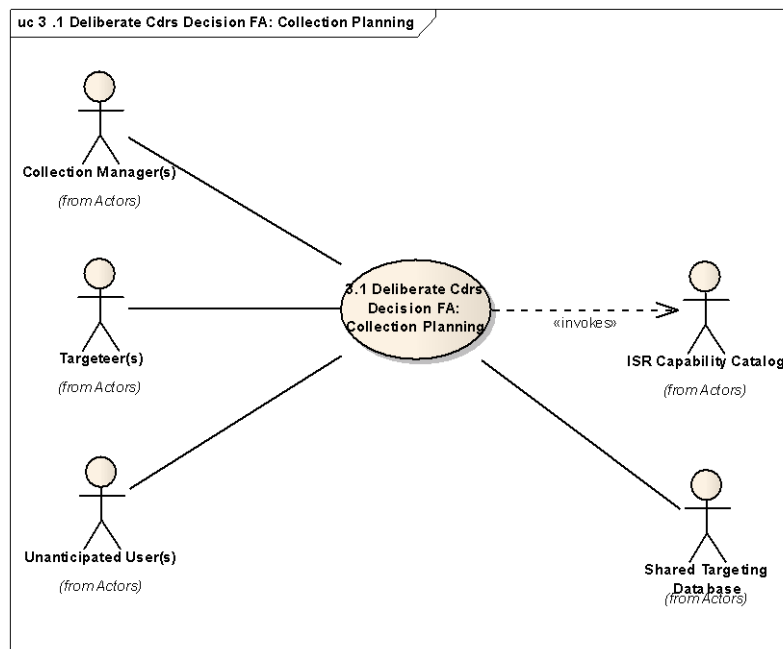


Figure 8: 3 .1 Deliberate Cdrs Decision FA: Collection Planning

2.5.1 3.1 Deliberate Cdrs Decision FA: Collection Planning

Perform collection management activities associated with arranging ISR for expected campaign based on planned targets and expected effects.

Flow of Events

Alternate

Automated

Collection management services automatically order ISR based on needs of target deck

Basic Path

Typical

1. Targeteers work with collection manager to plan coverage of planned targets

Alternate

EC08 JMT

1. Supports Joint Targeting
2. Invokes ISR Management
3. Might initiate Persistent Surveillance

Pre-condition

Status: Approved

Targets are defined

There needs to be a target deck to collect against or series of noms

2.6 4 Dynamic Plan Phase Use Cases

These use cases describe FMV interactions during the Plan phase of dynamic targeting. The Plan phase usually involves characterizing the TST environment, defining the rules of engagement, and planning ISR resource utilization to cover expected target activity and engagement dynamics.

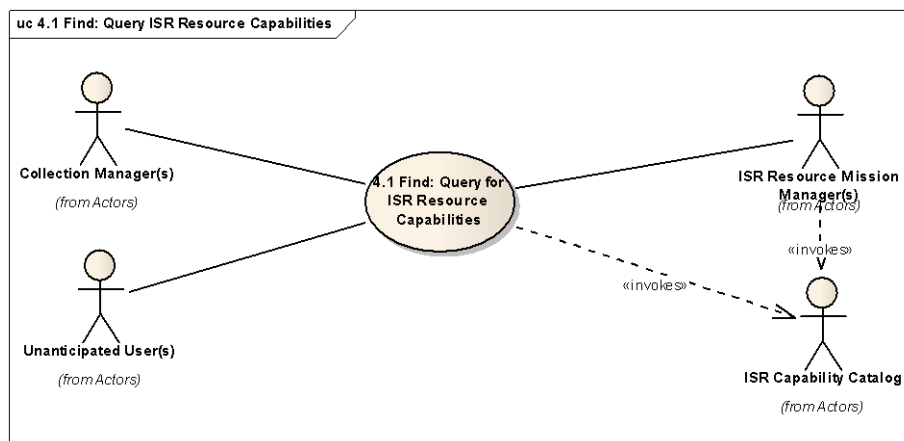


Figure 9: 4.1 Find: Query ISR Resource Capabilities

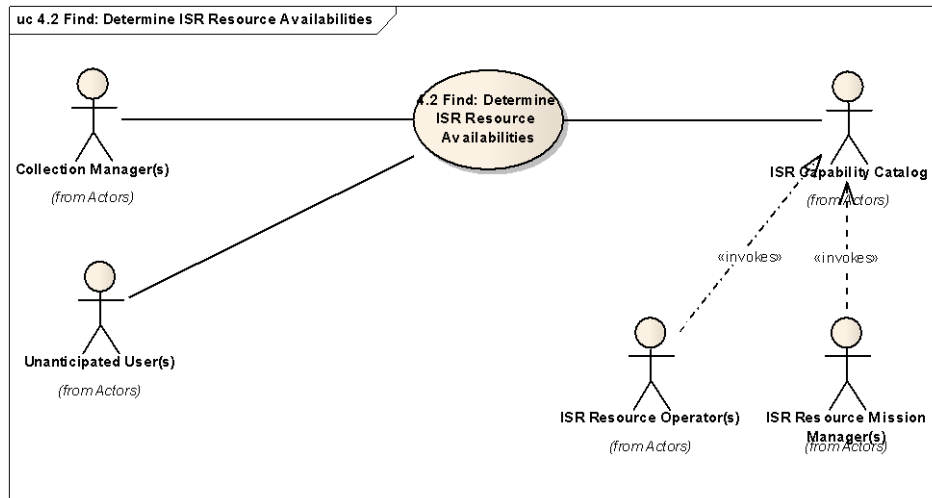


Figure 10: 4.2 Find: Determine ISR Resource Availabilities

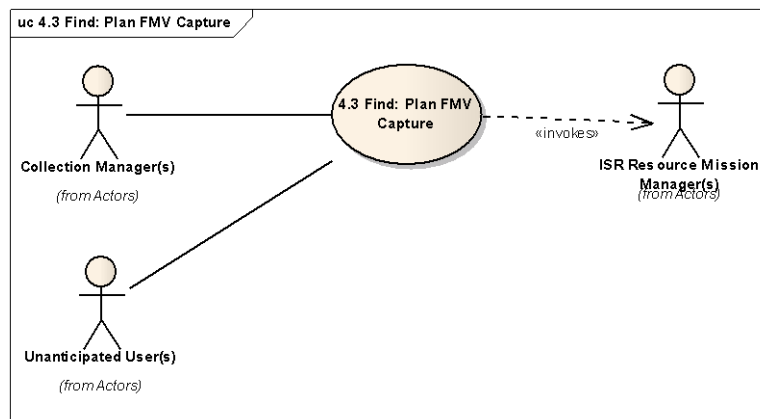


Figure 11: 4.3 Find: Plan FMV Capture

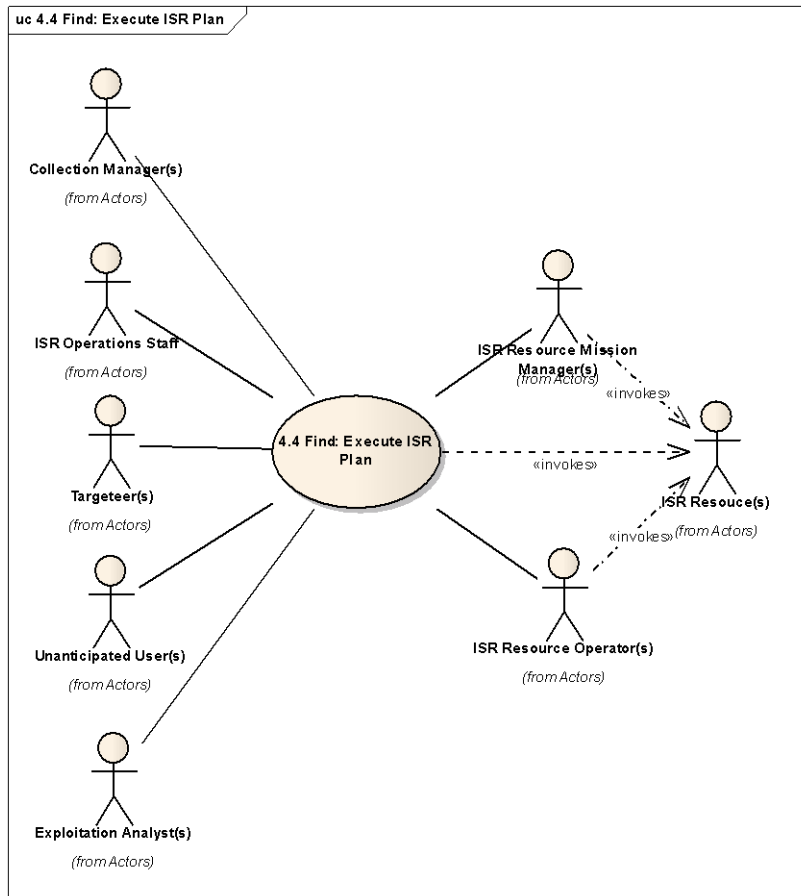


Figure 12: 4.4 Find: Execute ISR Plan

2.6.1 4.1 Find: Query for ISR Resource Capabilities

Determines the capabilities of ISR assets allocated to theater.

Flow of Events

Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources can join the fight
2. CM determines this information
3. CM advises planners of ISR resource capabilities that suit the planning problem

Alternate

Automated

1. TST planners consult resource capability service to learn ISR resource posture
2. TST planners discover descriptions of resource capabilities
3. TST planners determine best resource usage plan

Alternate

EC08 JMT

1. Invokes ISR Management

2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Apportionment of theater ISR resources

ISR assets or portions/budgets thereof must have been assigned to the theater in such a way as a query can find them

Pre-condition

Status: Approved

Collection Manager is aware of ISR resource registry

Collection manager or CM services must have some way to know where to search for a theater ISR asset capabilities catalog or registry

Process

Status: Approved

Search limitations

Search could be limited to particular sensor types, geometries, time of availability, coverage, reliability, sensor ownership, and/or other factors

Process

Status: Approved

Search also considers TPED assets if needed

Theater ISR capabilities must be assessed from a systems perspective in that all TCPED resources are considered, not just the collector

Post-condition

Status: Approved

Sensor capabilities are known

The capabilities of theater ISR resources is known

2.6.2 4.2 Find: Determine ISR Resource Availabilities

Determines which ISR assets will be or are available. Could be driven by spatial, temporal, or spectral capability constraints.

Flow of Events

Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources are available to support execution plan
2. CM determines this information
3. CM advises planners of ISR resource availabilities that suit the planning problem

Alternate

Automated

1. TST planners consult ISR resource availability service
2. TST planners select available resources that suit the execution plan

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Theater ISR capabilities are known

Capabilities of the theater ISR collectors is known

Process

Status: Approved

Limitations

The search for asset availability may be constrained to a period of time, sensor tuning/discipline, spatial concern, ownership, reliability, or other constraints

Process

Status: Approved

Search also considers TPED assets if needed

Availability determination must include TPED elements if these are needed to support sensor use

Post-condition

Status: Approved

Availability of the theater ISR resources is known

In addition to the capabilities of theater ISR resources, the availability of these resources is also known

2.6.3 4.3 Find: Plan FMV Capture

Plan for the CPED of a FMV sensor.

Flow of Events

Basic Path

Typical

1. ISR Operations Staff and Collection Managers assist TST Planners to build a workable ISR resource plan featuring FMV resources

Alternate

Automated

1. TST Planners build a workable ISR resource plan featuring FMV resources

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Capabilities of ISR platforms are known

The capability of platforms is known prior to planning their use

Pre-condition

Status: Approved

FMV capabilities exist and are available

In order to plan FMV capture, one or more platforms capable of performing FMV capture must exist

Pre-condition

Status: Approved

FMV TPED resources exist and are available

In order to plan for FMV capture, FMV TPED resources must exist and must have windows of availability

Post-condition

Status: Approved

FMV capture is planned

Post-condition

Status: Approved

FMV TPED is planned

2.6.4 4.4 Find: Execute ISR Plan

Executes the ISR plan by invoking all planned resources in a systematic fashion, monitoring the assets, processing, exploiting, and disseminating products, and if need be adjusting the plan.

Flow of Events

Basic Path

Typical

1. CPED resources are tasked by CM processes
2. Mission managers and/or operators notify or program resources
3. Resources acknowledge tasking
4. Collection operations begin
5. Raw information is collected
6. Raw information is published
7. Raw information is processed
8. Processed information is enhanced, analyzed, exploited
9. Analysis results are published
10. Collection is monitored
11. Collection is tuned
12. Resource is recovered

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition
FMV resources are available

Status: Approved

Process
FMV resources remain available

Status: Approved

2.7 5 Dynamic Find Phase Use Cases

These use cases describe FMV interactions during the Find phase of dynamic targeting. The Find Phase attempts to identify, classify, and characterize potential targets.

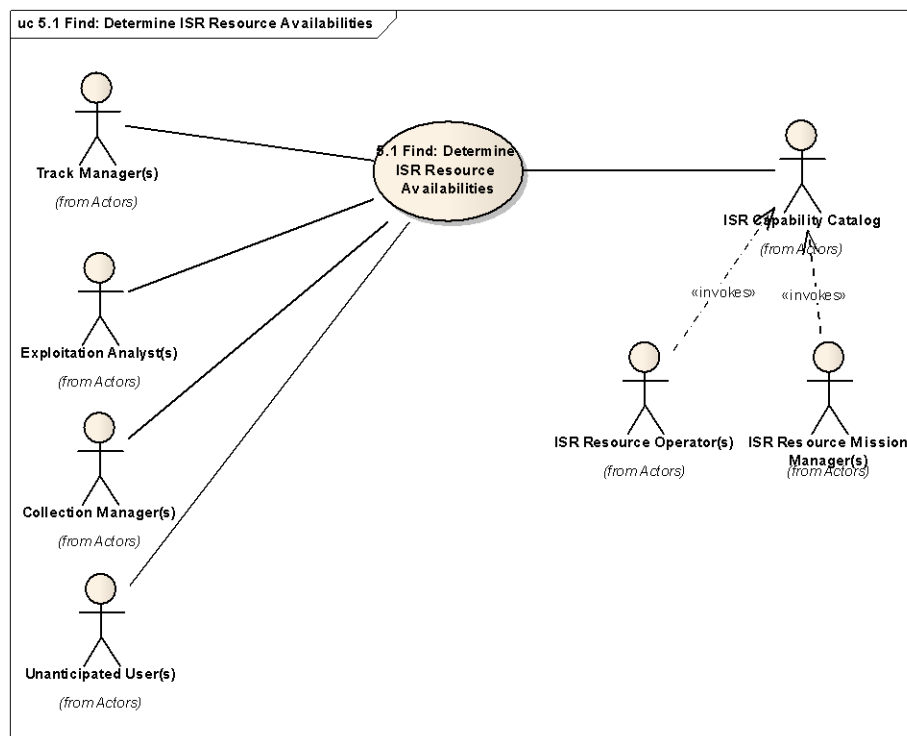


Figure 13: 5.1 Find: Determine ISR Resource Availabilities

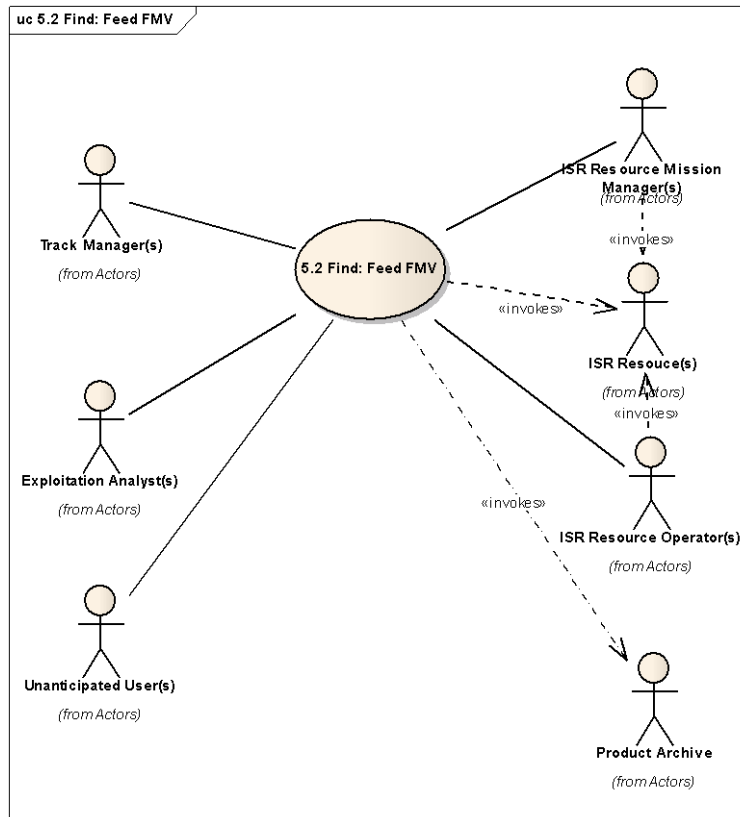


Figure 14: 5.2 Find: Feed FMV

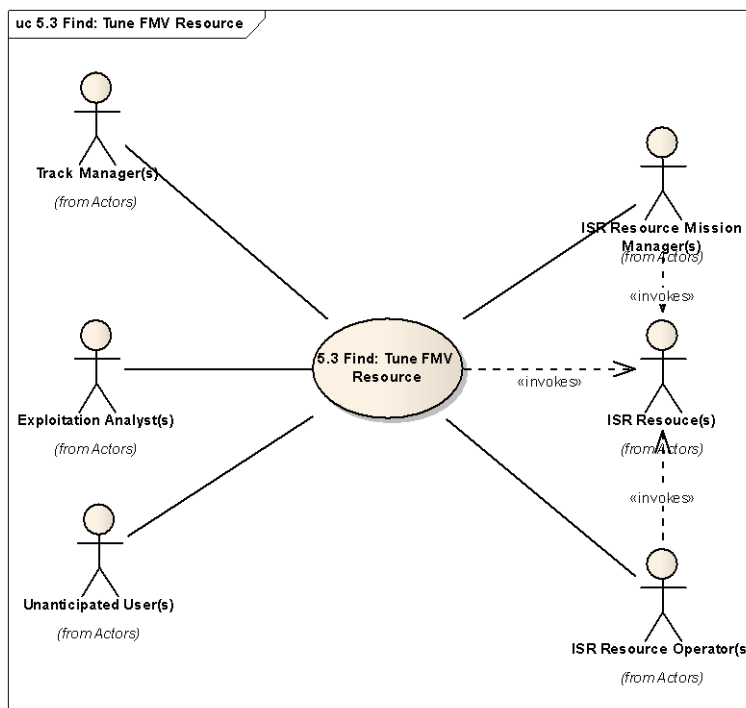


Figure 15: 5.3 Find: Tune FMV Resource

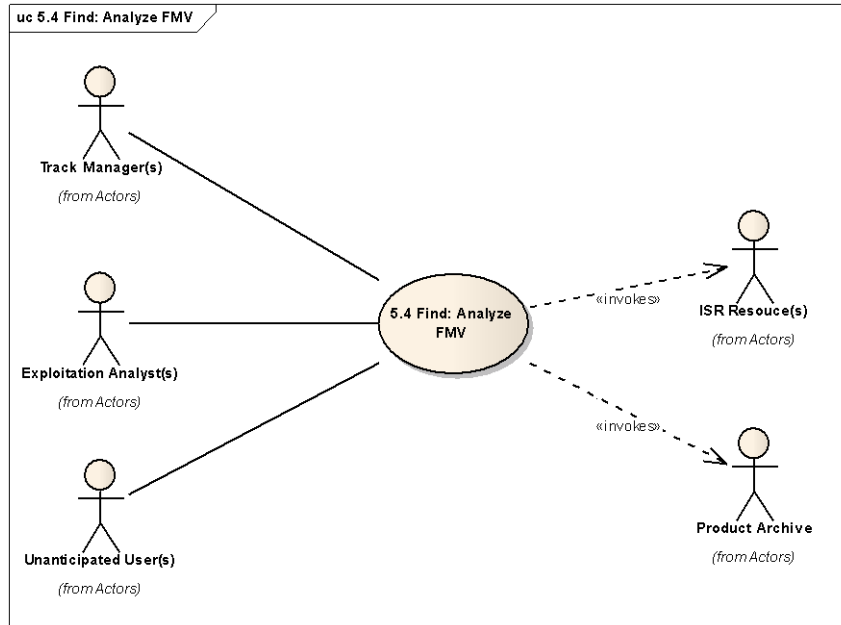


Figure 16: 5.4 Find: Analyze FMV

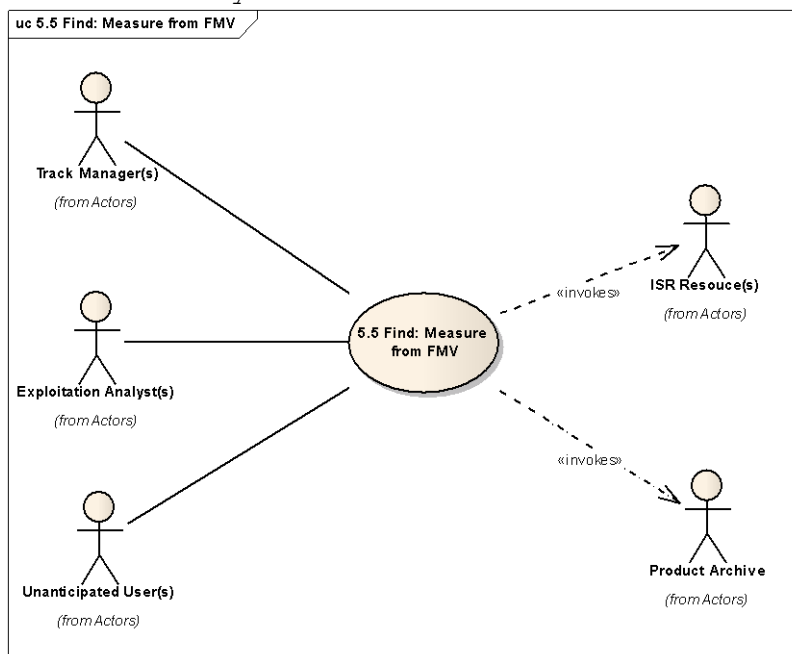


Figure 17: 5.5 Find: Measure from FMV

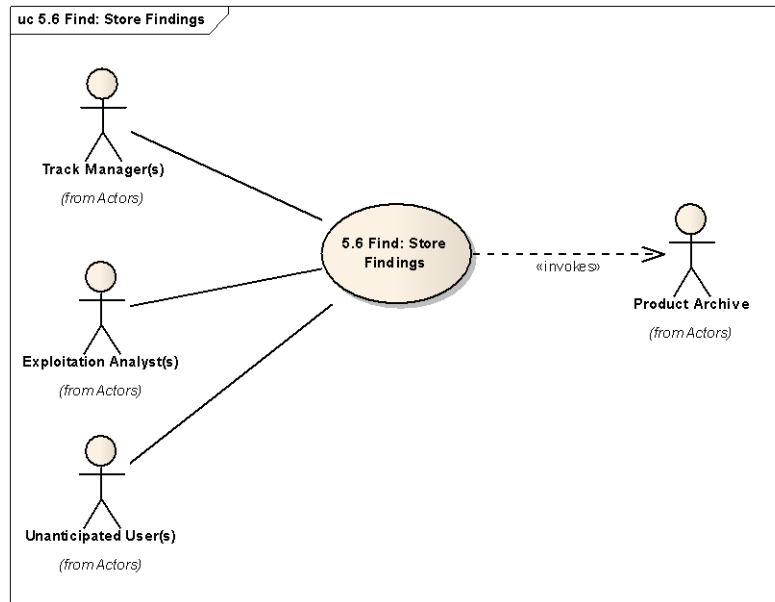


Figure 18: 5.6 Find: Store Findings

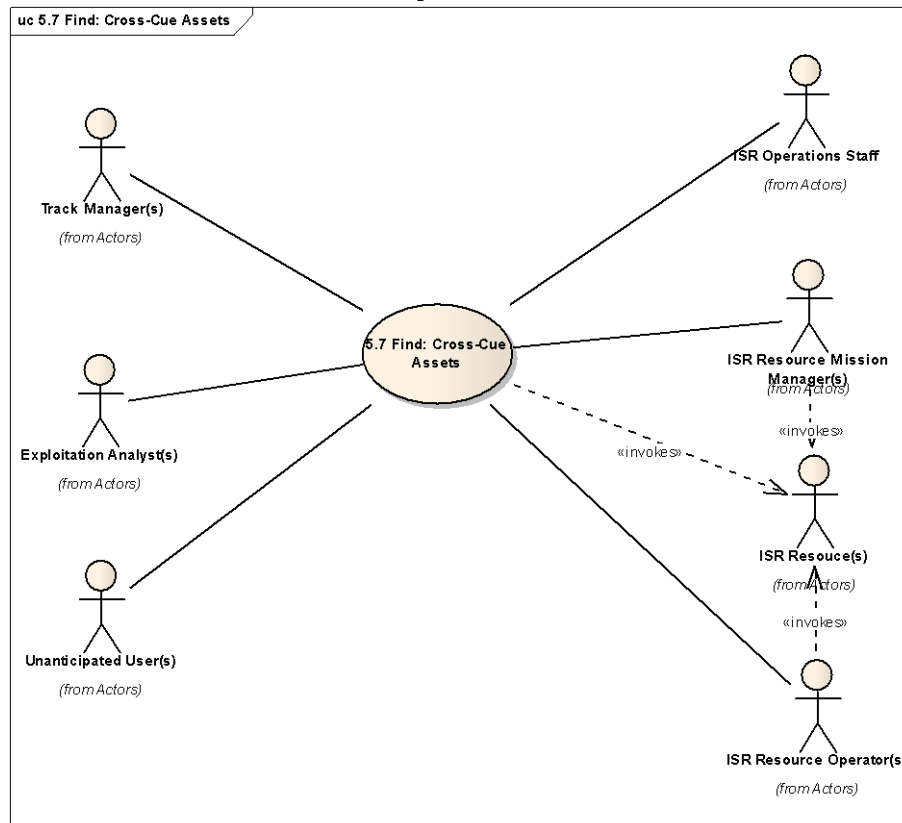


Figure 19: 5.7 Find: Cross-Cue Assets

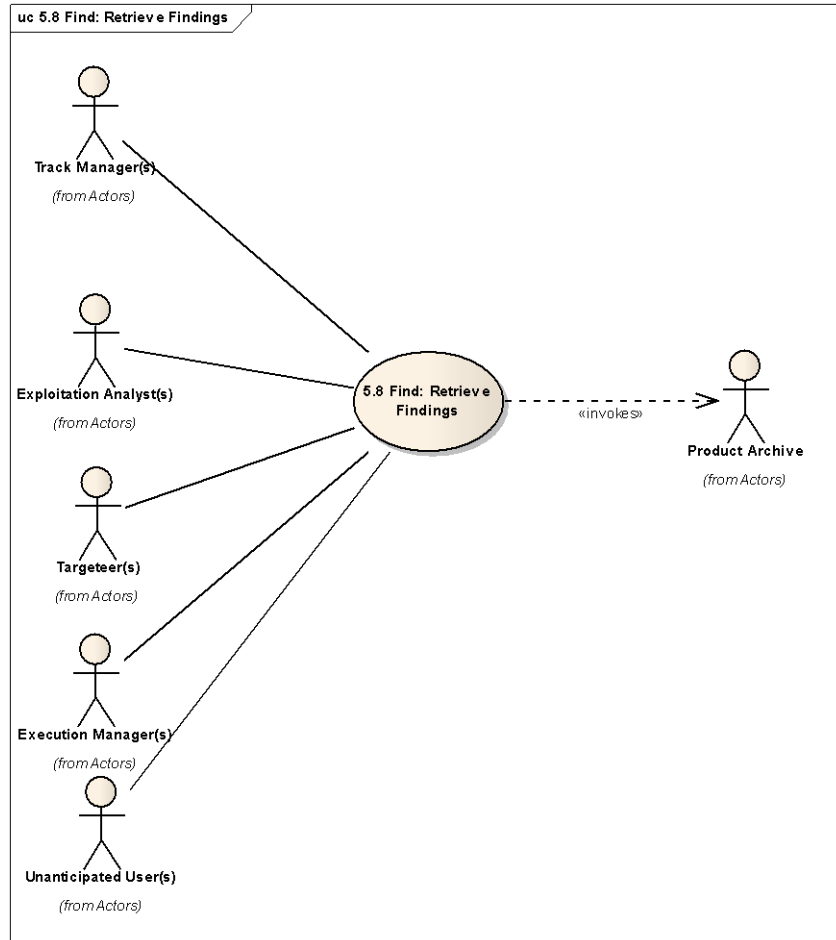


Figure 20: 5.8 Find: Retrieve Findings

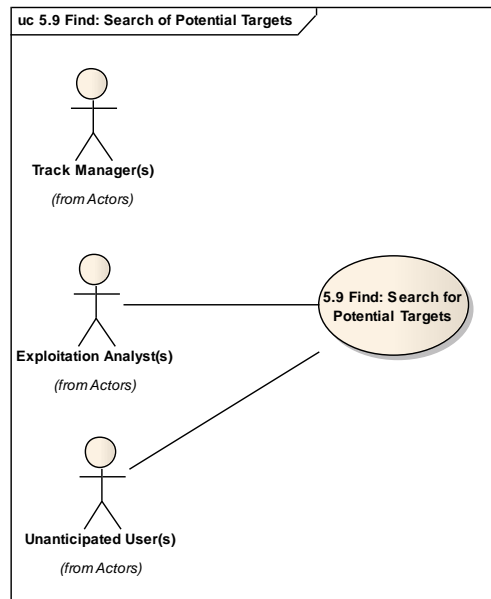


Figure 21: 5.9 Find: Search of Potential Targets

2.7.1 5.1 Find: Determine ISR Resource Availabilities

Determines which ISR assets are available to support the Find phase. Could be driven by spatial, temporal, or spectral capability constraints.

Flow of Events

Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources are available to support execution plan
2. CM determines this information
3. CM advises planners of ISR resource availabilities that suit the planning problem

Alternate

Automated

1. TST planners consult ISR resource availability service
2. TST planners select available resources that suit the execution plan

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Theater ISR capabilities are known

Capabilities of the theater ISR collectors is known

Process

Status: Approved

Limitations

The search for asset availability may be constrained to a period of time, sensor tuning/discipline, spatial concern, ownership, reliability, or other constraints

Process

Status: Approved

Search also considers TPED assets if needed

Availability determination must include TPED elements if these are needed to support sensor use

2.7.2 5.2 Find: Feed FMV

FMV is fed from live sources or from storage to the track manager who is attempting to identify, classify, and characterize potential targets. A sensor operator and/or analyst may be needed to assist with this activity.

Flow of Events

Basic Path

Typical

1. User connects to live feed
2. FMV feed streams to user

Alternate

Buffered feed

1. Comms, collector, or exploitation latency occurs
2. FMV product is temporarily buffered

Alternate

Archival feed

1. User desires to review FMV captured at an earlier time/date
2. Captured feed is located in archive
3. Captured feed is streamed to user from archive

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Pre-condition

Status: Approved

Resource is available

Live or archival resource is available to feed FMV

Process

Status: Approved

Resource remains available

Resource remains available throughout fix operation

2.7.3 5.3 Find: Tune FMV Resource

Perform adjustments to the FMV asset tuning. This could be spatial (pointing, slewing, zooming), spectral, or some other control parameter adjustment. During the find phase, tuning would likely be needed to help identify, classify, or characterize a potential target. This may concern tuning between a broad area search mode and a target analysis mode.

Flow of Events

Basic Path

Typical

1. Track Manager or Analyst requests change in resource tuning parameters
2. Sensor operator, mission manager, or resource validates request
3. Sensor operator, mission manager, or resource performs request
4. Feedback is sent to requestor

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition*Status: Approved***Resource is tunable**

Not all resources will offer tunable parameters

Process*Status: Approved***User has permission to tune resource**

User must have permission to alter resource tuning

2.7.4 5.4 Find: Analyze FMV

Analyze contents of live or recorded FMV feed. This could include contrast / brightness adjustment, feature extraction, replay, stop motion, slow motion etc. In the case of Find operations, the analyst will be trying to discover new targets, and to identify and characterize potential targets. In this mode, analysis may take the form of screening broad area search or rendering in higher res depending upon where in the find process a certain potential target is.

Flow of Events**Basic Path****Typical**

1. Analyst controls presentation of FMV product
2. Analyst records findings

Alternate**EC08 JMT**

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Process*Status: Approved***Exploitation support data are present**

ESD may need to be present in the stream to effectively analyze the FMV feed.

2.7.5 5.5 Find: Measure from FMV

Allow analyst to measure some quantity from the FMV feed/replay for the purpose of identifying, characterizing, or classifying a potential target.

Flow of Events**Basic Path****Typical**

1. Analyst freezes feed
2. Analyst measures location or dimension
3. Analyst is given correct value for measurement

Alternate

Moving measurement

1. Analyst controls feed display rate
2. Analyst measures a value against moving frames (e.g., velocity)
3. Analyst is provided with measured value

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Process

Status: Approved

Presence of ESD in feed

This use case relies on some form of ESD metadata to be present in the feed so that accurate positional and dimensional information can be extracted from the product.

2.7.6 5.6 Find: Store Findings

Place contents of feed or analytical sub-products into some form of archive for later review or retrieval.

Flow of Events

Basic Path

Typical

1. Analyst indicates FMV segment and analytical products to be saved
2. Analyst initiates storage process
3. Materials are stored on media

Alternate

Automated

All FMV take and analytical operations are stored

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Media availability

Media must be available to record or store findings

Process

Status: Approved

Media capacity

Sufficient media must exist to store selected FMV feed

2.7.7 5.7 Find: Cross-Cue Assets

Cause sensors to multilaterate on a designated target. This is often needed to hand-off a target during fix operations or to improve the ability of the enterprise to resolve an object so as to better identify, locate, or characterize a potential target. This activity might cue an ISR resource other than another FMV resource such as an spectral, MTI, or radar capability. In the fix mode, cross cue might also include the handoff between a broad area search resource and a resource with a higher spatial/spectral/temporal resolution.

Flow of Events

Basic Path

Typical

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
5. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
8. Feed is cut over to new resource
9. Analyst confirms new feed

Alternate

Multilateration

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
5. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
8. Feed is added to joint processing
9. Analyst confirms new feed
10. Multilateral analysis begins

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Resources are available to cross cue

To cross cue, sufficient resources must be available

Status: Approved

Process

Status: Approved

Operator awareness

ISR operations managers and analysts must be aware that other ISR resources are available to support cross cueing

Process

Status: Approved

Permission to control

Operators must have permission to cue other resources

Process

Status: Approved

Availability of PED

Cued collection resources must have available PED resources

Process

Status: Approved

Means for effective hand-off

Some means to pass pointing vectors must exist

2.7.8 5.8 Find: Retrieve Findings

Retrieve previous findings from earlier fix operations. This is needed to retrieve the fix decision pedigree or review/examine what was fixed and how it was fixed from FMV or fused products.

Flow of Events

Basic Path

Typical

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media segment
3. FMV segment is spooled for review

Alternate

Offline pull

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media storage container as offline
3. Container is retrieved and loaded
4. FMV segment is spooled for review

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Material must have been recorded

To be retrieved, FMV products must have been recorded at some point

Pre-condition

Status: Approved

Recording is locatable

Recorded media must have been tagged, labeled, indexed, or catalogued so that it can be discovered again. Recording resource must also be online and available.

Pre-condition*Status: Approved***Recorded material format**

Recorded material must be in a format compatible with existing playback/analysis capabilities

2.7.9 5.9 Find: Search for Potential Targets

Using persistent and/or wide area coverage ISR resources, search for objects in a field of view/detection that might represent potential tracks or targets.

Flow of Events**Basic Path****Typical**

1. ISR resource scans large area
2. Objects of possible interest are detected
3. Higher resolution means or means from other discipline used to confirm interest
4. Potential targets enter tracking or targeting phase

Alternate**EC08 JMT**

1. Invokes Persistent Surveillance
2. Supports NT-ISR
3. Supports MDA

Process*Status: Approved***ISR resources in place****Process***Status: Approved***ISR Resources correctly tuned**

ISR resources are pointed at the right area and conditioned the right to detect expected activity

2.8 6 Dynamic Fix Phase Use Cases

These use cases describe FMV interactions during the Fix phase of dynamic targeting. The Fix Phase attempts to precisely locate potential targets.

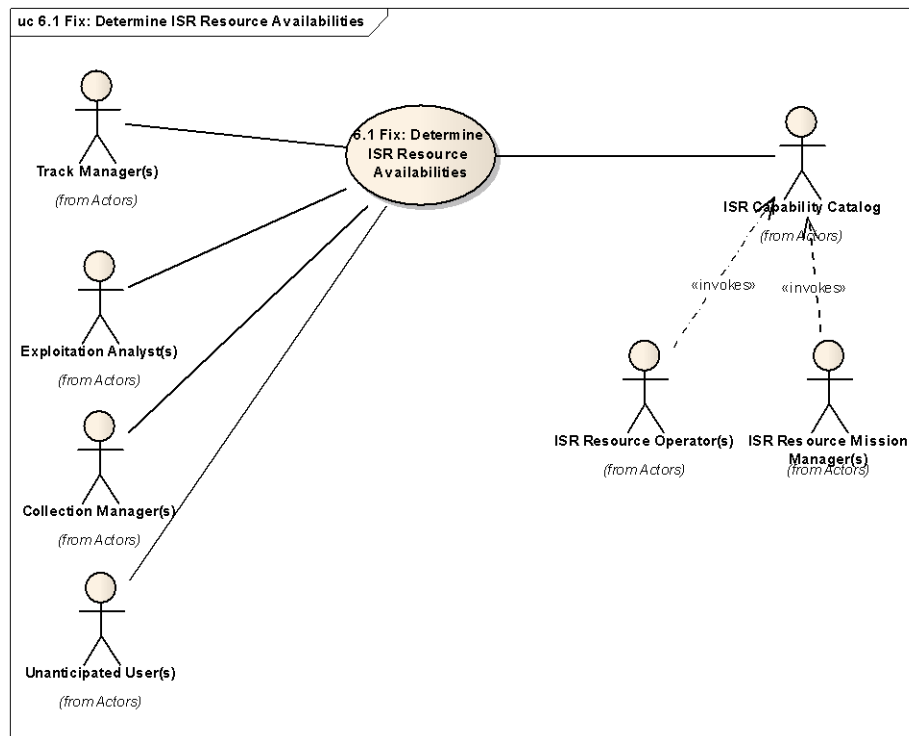


Figure 22: 6.1 Fix: Determine ISR Resource Availabilities

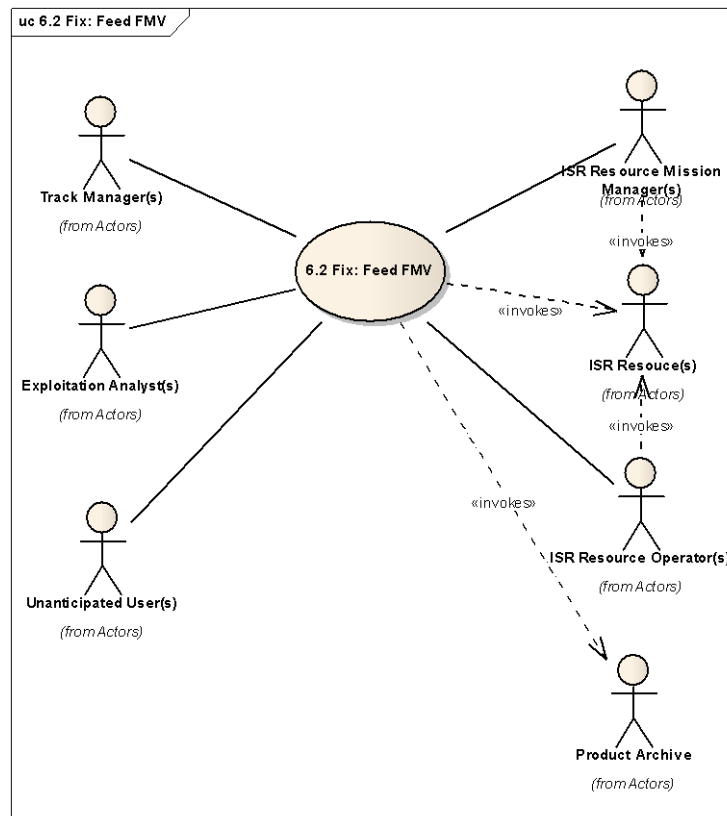


Figure 23: 6.2 Fix: Feed FMV

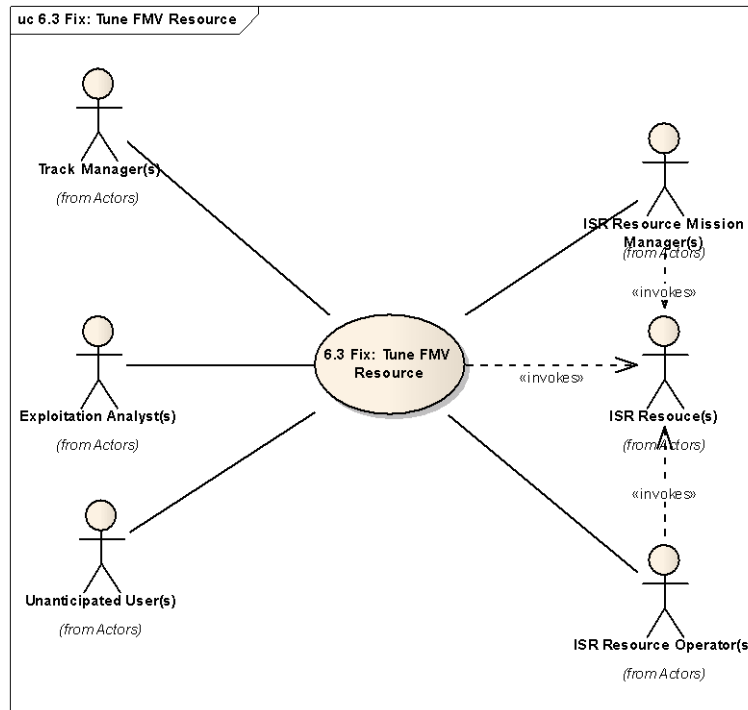


Figure 24: 6.3 Fix: Tune FMV Resource

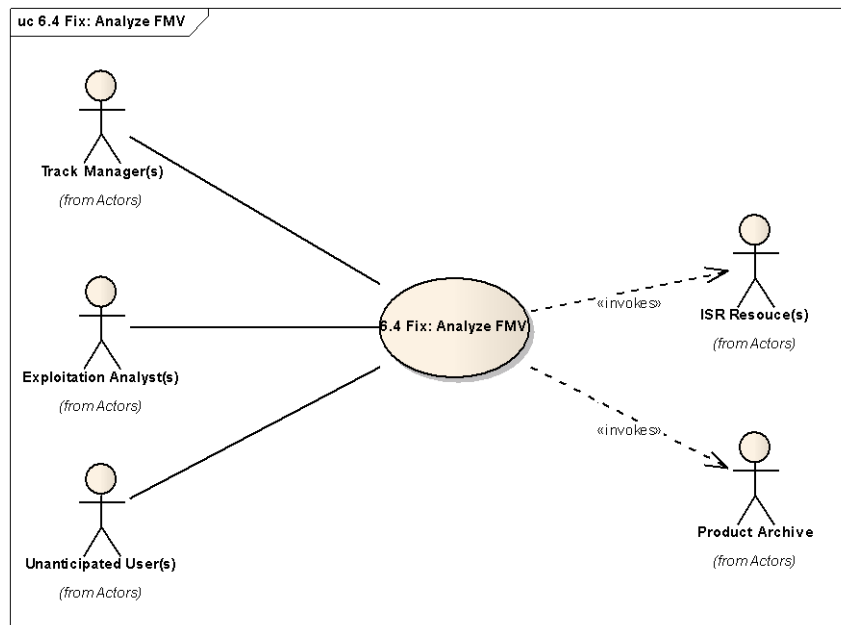


Figure 25: 6.4 Fix: Analyze FMV

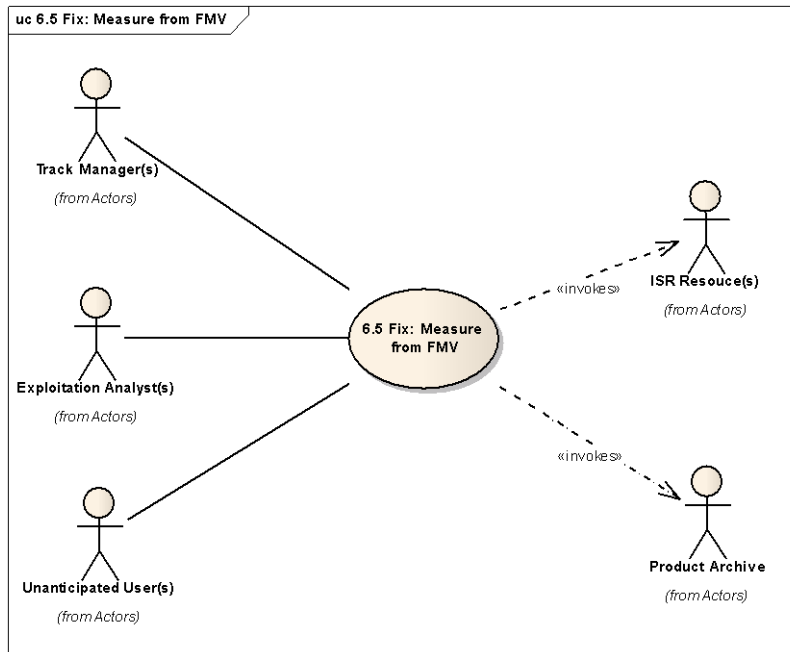


Figure 26: 6.5 Fix: Measure from FMV

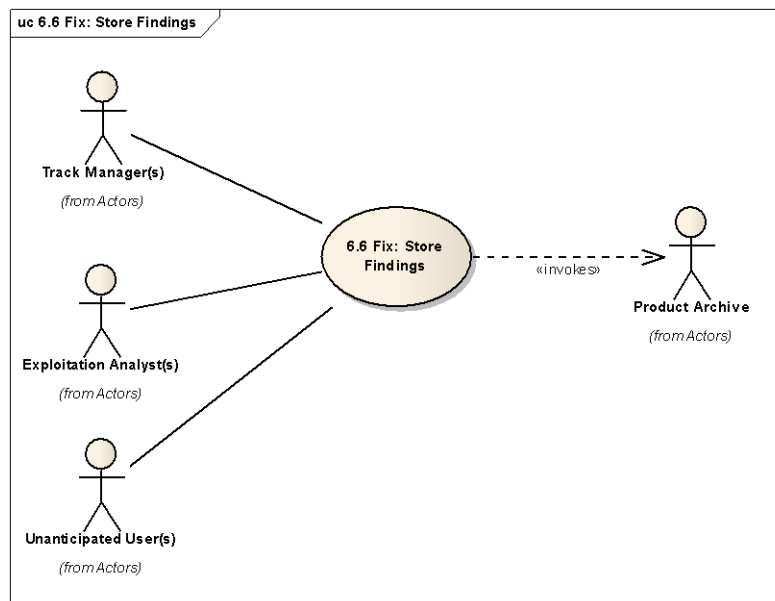


Figure 27: 6.6 Fix: Store Findings

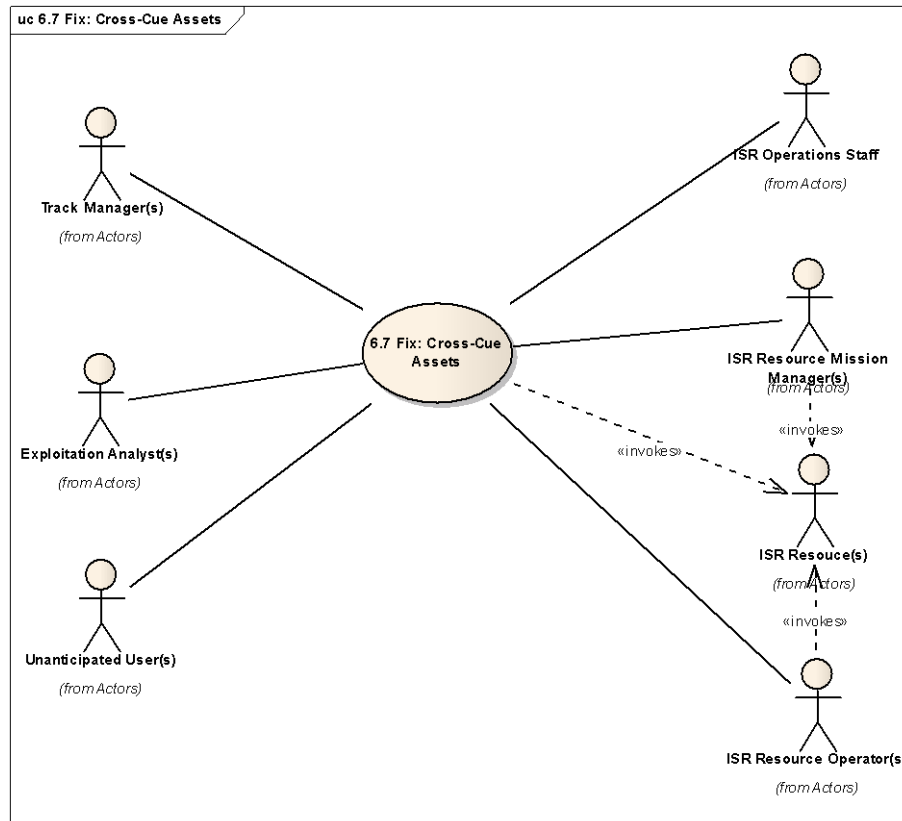


Figure 28: 6.7 Fix: Cross-Cue Assets

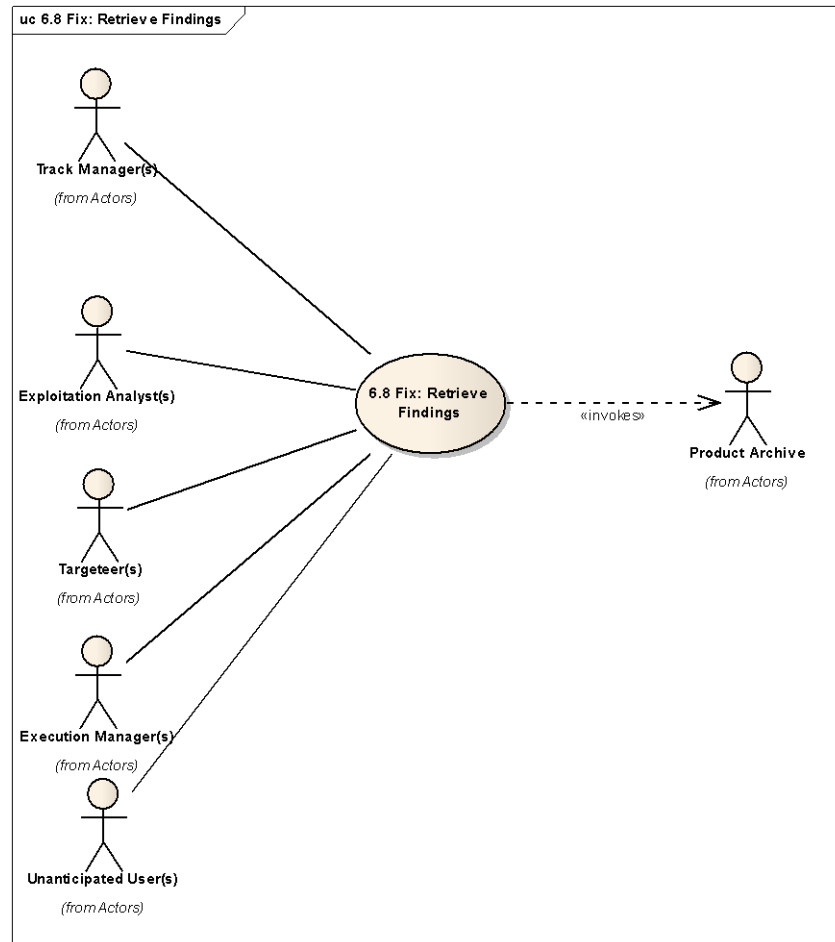


Figure 29: 6.8 Fix: Retrieve Findings

2.8.1 6.1 Fix: Determine ISR Resource Availabilities

Determines which ISR assets are available to support the Fix phase. Could be driven by spatial, temporal, or spectral capability constraints. Priority would go to a resource that can geolocate accurately.

Flow of Events

Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources are available to support execution plan
2. CM determines this information
3. CM advises planners of ISR resource availabilities that suit the planning problem

Alternate

Automated

1. TST planners consult ISR resource availability service
2. TST planners select available resources that suit the execution plan

and can support accurate geolocation

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Theater ISR capabilities are known

Capabilities of the theater ISR collectors is known

Process

Status: Approved

Limitations

The search for asset availability may be constrained to a period of time, sensor tuning/discipline, spatial concern, ownership, reliability, or other constraints

Process

Status: Approved

Search also considers TPED assets if needed

Availability determination must include TPED elements if these are needed to support sensor use

2.8.2 6.2 Fix: Feed FMV

FMV is fed from live sources or from storage to the track manager who is attempting to fix or otherwise locate potential targets. A sensor operator and/or analyst may be needed to assist with this activity.

Flow of Events

Basic Path

Typical

1. User connects to live feed
2. FMV feed streams to user

Alternate

Buffered feed

1. Comms, collector, or exploitation latency occurs
2. FMV product is temporarily buffered

Alternate

Archival feed

1. User desires to review FMV captured at an earlier time/date
2. Captured feed is located in archive
3. Captured feed is streamed to user from archive

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Pre-condition*Status: Approved***Resource is available**

Live or archival resource is available to feed FMV

Process*Status: Approved***Resource remains available**

Resource remains available throughout fix operation

2.8.3 6.3 Fix: Tune FMV Resource

Perform adjustments to the FMV asset tuning. This could be spatial (pointing, slewing, zooming), spectral, or some other control parameter adjustment. During the Fix phase, tuning would likely be needed to accurately locate a potential target. This may concern tuning between a broad area search mode and a target analysis mode.

Flow of Events**Basic Path****Typical**

1. Track Manager or Analyst requests change in resource tuning parameters
2. Sensor operator, mission manager, or resource validates request
3. Sensor operator, mission manager, or resource performs request
4. Feedback is sent to requestor

Alternate**EC08 JMT**

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition*Status: Approved***Resource is tunable**

Not all resources will offer tunable parameters

Process*Status: Approved***User has permission to tune resource**

User must have permission to alter resource tuning

2.8.4 6.4 Fix: Analyze FMV

Analyze contents of live or recorded FMV feed. This could include contrast / brightness adjustment, feature extraction, replay, stop motion, slow motion etc. In the case of Fix operations, the analyst will be trying to establish the location of new targets.

Flow of Events

Basic Path

Typical

1. Analyst controls presentation of FMV product
2. Analyst records findings

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Process

Status: Approved

Exploitation support data are present

ESD may need to be present in the stream to effectively analyze the FMV feed.

2.8.5 6.5 Fix: Measure from FMV

Allow analyst to measure some quantity from the FMV feed/replay.

Measurement in the Fix phase is typically to determine a precise position, length, width, or other spatial dimension.

Flow of Events

Basic Path

Typical

1. Analyst freezes feed
2. Analyst measures location or dimension
3. Analyst is given correct value for measurement

Alternate

Moving measurement

1. Analyst controls feed display rate
2. Analyst measures a value against moving frames (e.g., velocity)
3. Analyst is provided with measured value

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Process

Status: Approved

Presence of ESD in feed

This use case relies on some form of ESD metadata to be present in the feed so that accurate positional and dimensional information can be extracted from the product.

2.8.6 6.6 Fix: Store Findings

Place contents of feed or analytical sub-products into some form of archive for later review or retrieval.

Flow of Events

Basic Path

Typical

1. Analyst indicates FMV segment and analytical products to be saved
2. Analyst initiates storage process
3. Materials are stored on media

Alternate

Automated

All FMV take and analytical operations are stored

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Media availability

Media must be available to record or store findings

Process

Status: Approved

Media capacity

Sufficient media must exist to store selected FMV feed

2.8.7 6.7 Fix: Cross-Cue Assets

Cause sensors to multilaterate on a designated target. This is often needed to hand-off a target during fix operations or to improve the ability of the enterprise to resolve an object so as to better locate the target or characterize its spatial potential target. This activity might cue an ISR resource other than another FMV resource such as an spectral, MTI, or radar capability. In the fix mode, cross cue might also include the handoff between a broad area search resource and a resource with a higher spatial/spectral/temporal resolution.

Flow of Events

Basic Path

Typical

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be

- cued
- 3. Sensor / mission manager / sensor operator of cued sensor indicates assent
- 4. Pointing vector is developed
- 5. Pointing vector is sent
- 6. Cued sensor slews to new vector
- 7. Cued resource indicates ready state
- 8. Feed is cut over to new resource
- 9. Analyst confirms new feed

Alternate

Multilateration

- 1. Analyst / operator gains awareness of other cueable resources
- 2. Analyst / operator initiates coordination with operator of sensor to be cued
- 3. Sensor / mission manager / sensor operator of cued sensor indicates assent
- 4. Pointing vector is developed
- 5. Pointing vector is sent
- 6. Cued sensor slews to new vector
- 7. Cued resource indicates ready state
- 8. Feed is added to joint processing
- 9. Analyst confirms new feed
- 10. Multilateral analysis begins

Alternate

EC08 JMT

- 1. Invokes ISR Management
- 2. Supports NT-ISR
- 3. Supports MDA
- 4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Resources are available to cross cue

To cross cue, sufficient resources must be available

Process

Status: Approved

Operator awareness

ISR operations managers and analysts must be aware that other ISR resources are available to support cross cueing

Process

Status: Approved

Permission to control

Operators must have permission to cue other resources

Process

Status: Approved

Availability of PED

Cued collection resources must have available PED resources

Process

Status: Approved

Means for effective hand-off

Some means to pass pointing vectors must exist

2.8.8 6.8 Fix: Retrieve Findings

Retrieve previous findings from earlier fix operations. This is needed to retrieve the fix decision pedigree or review/examine what was fixed and how it was fixed from FMV or fused products.

Flow of Events

Basic Path

Typical

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media segment
3. FMV segment is spooled for review

Alternate

Offline pull

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media storage container as offline
3. Container is retrieved and loaded
4. FMV segment is spooled for review

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Material must have been recorded

To be retrieved, FMV products must have been recorded at some point

Pre-condition

Status: Approved

Recording is locatable

Recorded media must have been tagged, labeled, indexed, or catalogued so that it can be discovered again. Recording resource must also be online and available.

Pre-condition

Status: Approved

Recorded material format

Recorded material must be in a format compatible with existing playback/analysis capabilities

2.9 7 Dynamic Track Phase Use Cases

These use cases describe FMV interactions during the Track phase of dynamic targeting. The Track phase typically concerns maintaining track on actual and potential targets that have been located so far.

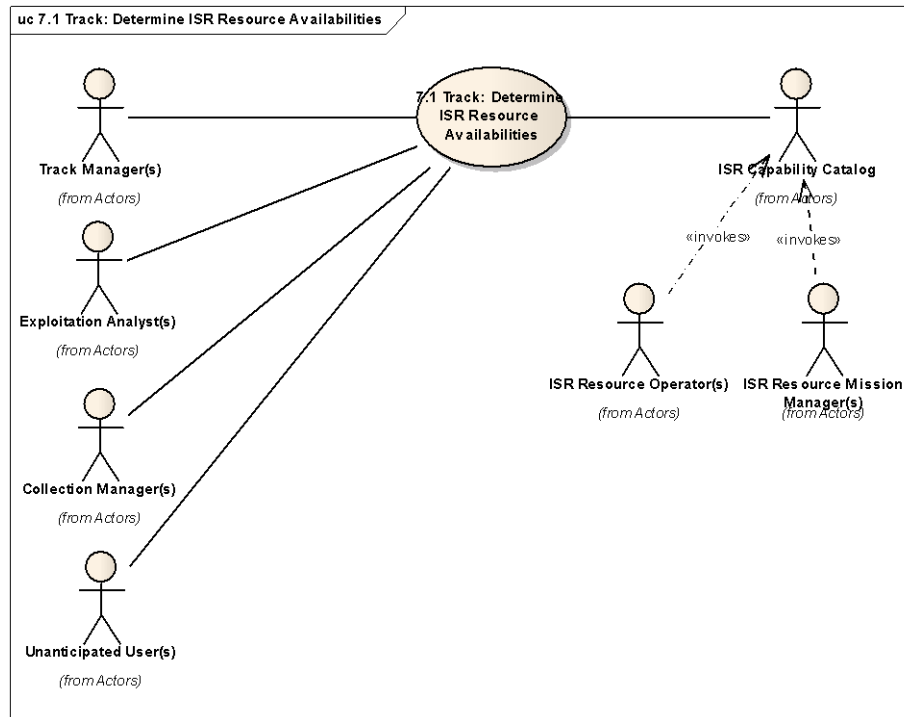


Figure 30: 7.1 Track: Determine ISR Resource Availabilities

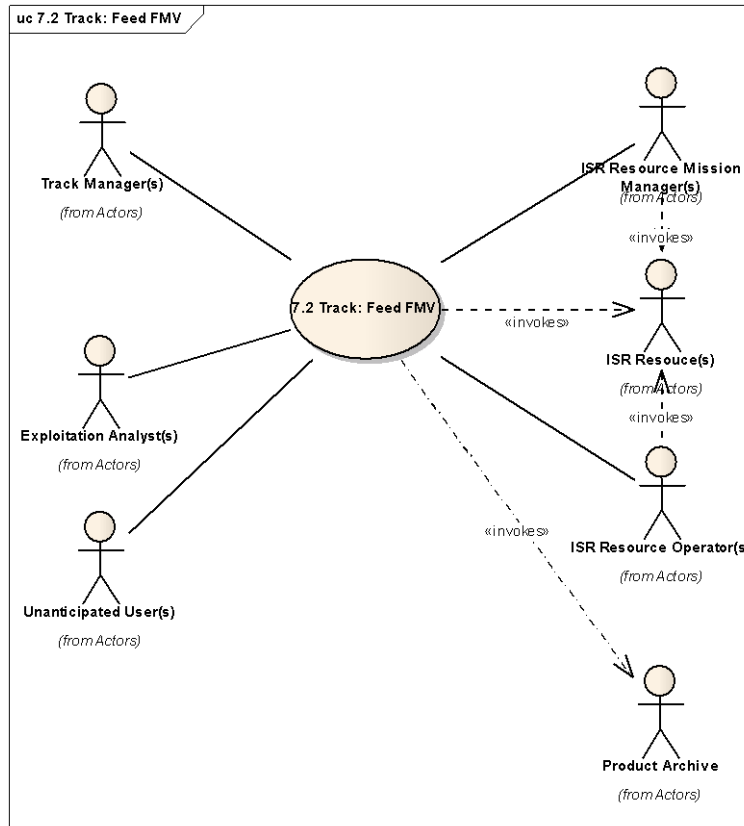


Figure 31: 7.2 Track: Feed FMV

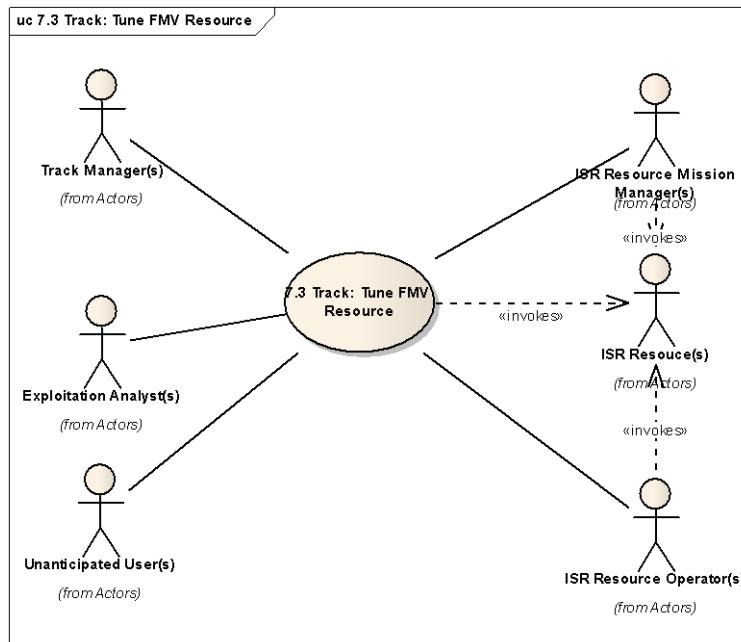


Figure 32: 7.3 Track: Tune FMV Resource

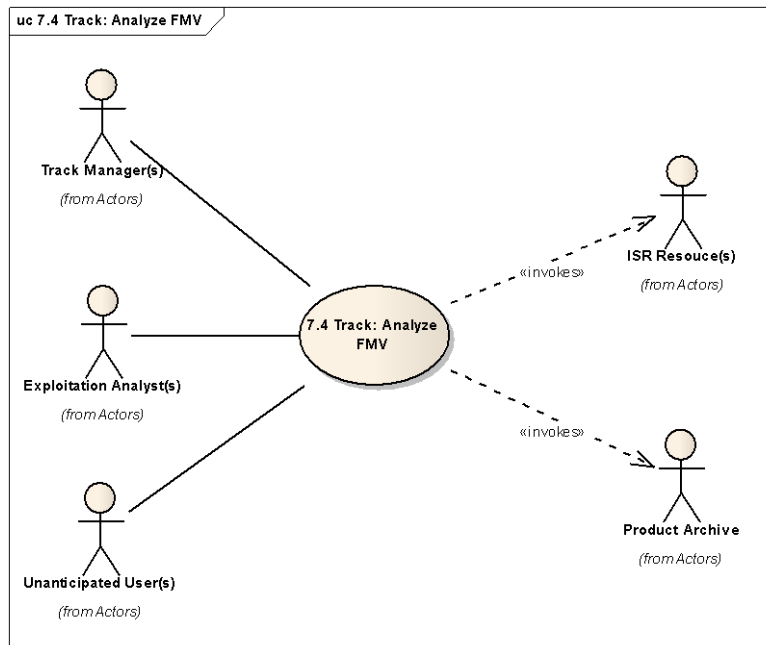


Figure 33: 7.4 Track: Analyze FMV

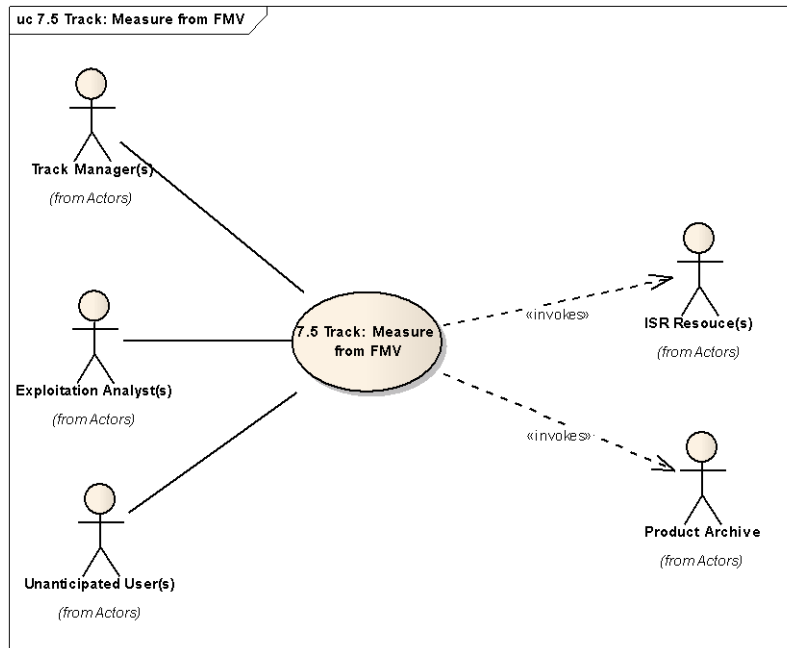


Figure 34: 7.5 Track: Measure from FMV

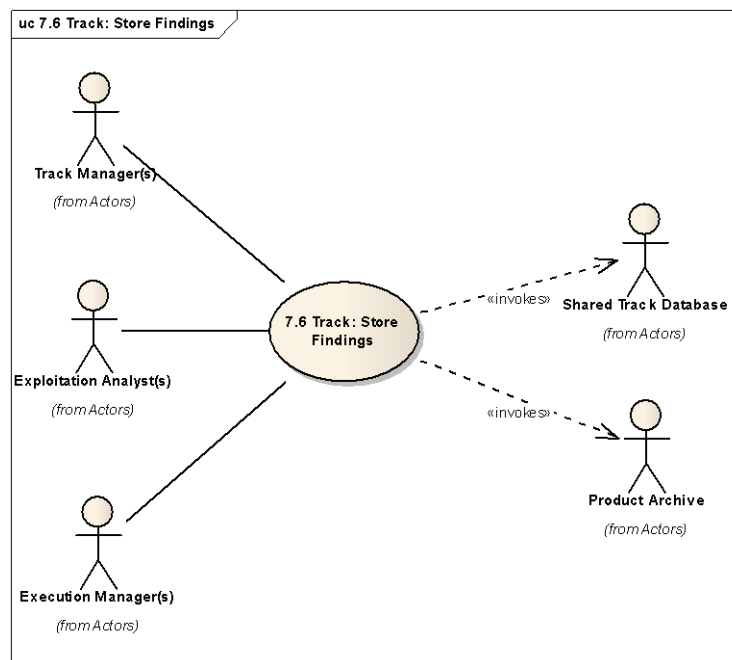


Figure 35: 7.6 Track: Store Findings

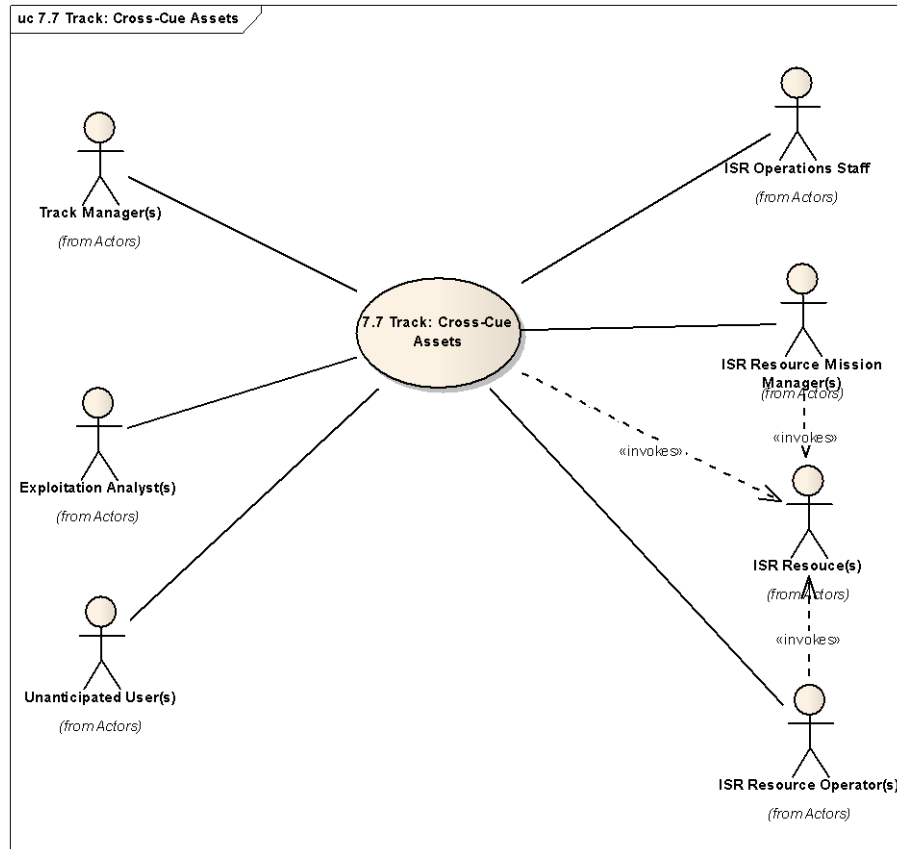


Figure 36: 7.7 Track: Cross-Cue Assets

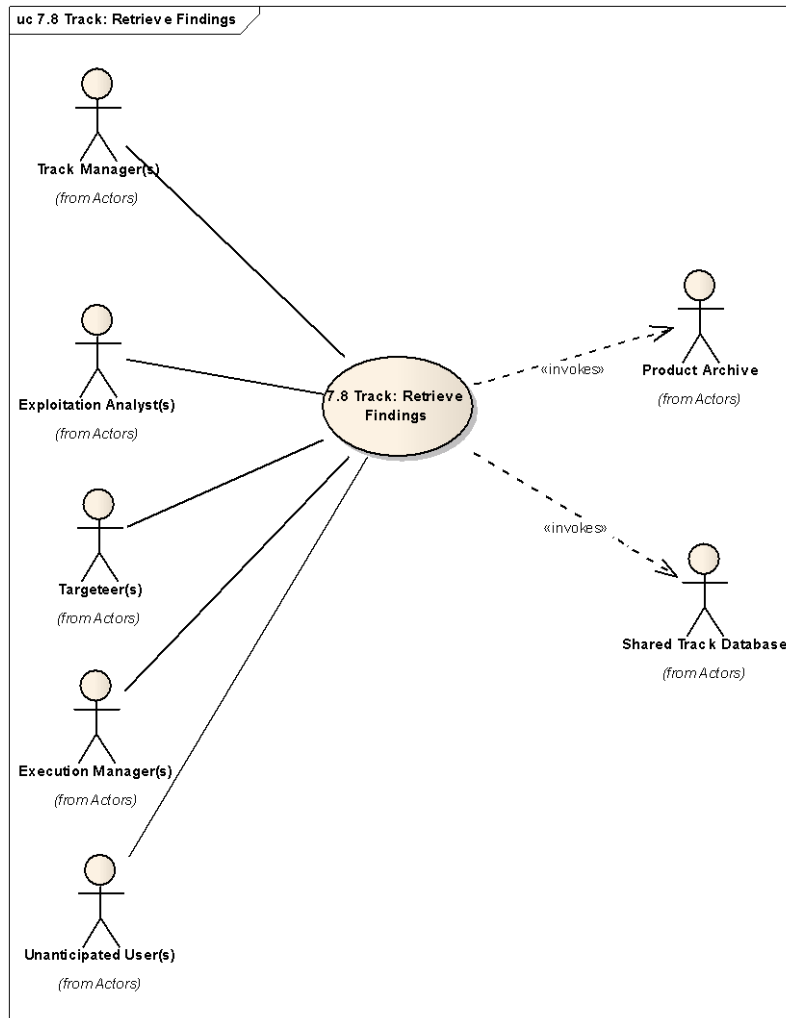


Figure 37: 7.8 Track: Retrieve Findings

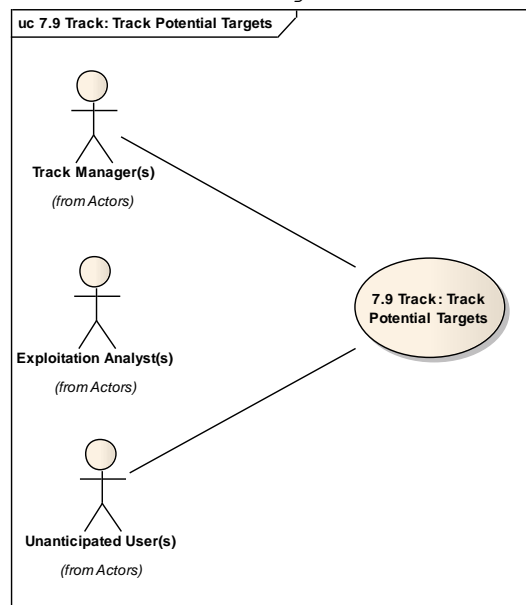


Figure 38: 7.9 Track: Track Potential Targets

2.9.1 7.1 Track: Determine ISR Resource Availabilities

Determines which ISR assets are available to support the Track phase. Could be driven by spatial, temporal, or spectral capability constraints.

Flow of Events

Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources are available to support execution plan
2. CM determines this information
3. CM advises planners of ISR resource availabilities that suit the planning problem

Alternate

Automated

1. TST planners consult ISR resource availability service
2. TST planners select available resources that suit the execution plan

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Theater ISR capabilities are known

Capabilities of the theater ISR collectors is known

Process

Status: Approved

Limitations

The search for asset availability may be constrained to a period of time, sensor tuning/discipline, spatial concern, ownership, reliability, or other constraints

Process

Status: Approved

Search also considers TPED assets if needed

Availability determination must include TPED elements if these are needed to support sensor use

2.9.2 7.2 Track: Feed FMV

FMV is fed from live sources or from storage to the track manager who is attempting to maintain track on actual and potential targets. A sensor operator and/or analyst may be needed to assist with this activity.

Flow of Events

Basic Path

Typical

1. User connects to live feed
2. FMV feed streams to user

Alternate

Buffered feed

1. Comms, collector, or exploitation latency occurs
2. FMV product is temporarily buffered

Alternate

Archival feed

1. User desires to review FMV captured at an earlier time/date
2. Captured feed is located in archive
3. Captured feed is streamed to user from archive

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Pre-condition

Status: Approved

Resource is available

Live or archival resource is available to feed FMV

Process

Status: Approved

Resource remains available

Resource remains available throughout Track operation

2.9.3 7.3 Track: Tune FMV Resource

Perform adjustments to the FMV asset tuning. This could be spatial (pointing, slewing, zooming), spectral, or some other control parameter adjustment. During the Track phase, tuning would likely be needed to follow, maintain track on, or reacquire a potential target. This may concern tuning between a broad area search mode and a target tracking modes.

Flow of Events

Basic Path

Typical

1. Track Manager or Analyst requests change in resource tuning parameters
2. Sensor operator, mission manager, or resource validates request
3. Sensor operator, mission manager, or resource performs request
4. Feedback is sent to requestor

Alternate

Lost track

1. Repointing resource loses object track
2. Sensor operator attempts to reacquire track

3. Track manager notified

Alternate

EC08 FMV

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Resource is tunable

Not all resources will offer tunable parameters

Process

Status: Approved

User has permission to tune resource

User must have permission to alter resource tuning

2.9.4 7.4 Track: Analyze FMV

Analyze contents of live or recorded FMV feed. This could include contrast / brightness adjustment, feature extraction, replay, stop motion, slow motion etc. In the case of Track operations, the analyst will be trying to follow potential targets and in some cases discover more about them. Inability to reacquire lost targets will revert to the Fix phase.

Flow of Events

Basic Path

Typical

1. Analyst controls presentation of FMV product
2. Analyst records findings

Alternate

EC08 FMV

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Process

Status: Approved

Exploitation support data are present

ESD may need to be present in the stream to effectively analyze the FMV feed.

2.9.5 7.5 Track: Measure from FMV

Allow analyst to measure some quantity from the FMV feed/replay for the purpose of maintaining track or reacquiring a potential target. An example would be to determine an updated location, course/heading, speed, and/or spatial extent of a potential target.

Flow of Events

Basic Path

Typical

1. Analyst freezes feed
2. Analyst measures location or dimension
3. Analyst is given correct value for measurement

Alternate

Moving measurement

1. Analyst controls feed display rate
2. Analyst measures a value against moving frames (e.g., velocity)
3. Analyst is provided with measured value

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance

Process

Status: Approved

Presence of ESD in feed

This use case relies on some form of ESD metadata to be present in the feed so that accurate positional and dimensional information can be extracted from the product.

2.9.6 7.6 Track: Store Findings

Place contents of feed or analytical sub-products into some form of archive for later review or retrieval. Store tracks into a replicated track database.

Flow of Events

Basic Path

Typical

1. Analyst indicates FMV segment and analytical products to be saved
2. Analyst initiates storage process
3. Materials are stored on media

Basic Path

Database update

Analyst updates location of track in shared track database

Alternate

Automated

All FMV take and analytical operations are stored

Alternate

Automated update

1. Tracker updates shared track database

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Media availability

Media must be available to record or store findings

Pre-condition

Status: Approved

Track database access

If writing to track database, need access to this item

Process

Status: Approved

Media capacity

Sufficient media must exist to store selected FMV feed

Process

Status: Approved

Track database permission

Will need permission to write to a shared track database

2.9.7 7.7 Track: Cross-Cue Assets

Cause sensors to multilaterate on a designated target. This is often needed to hand-off a target during Track operations. This activity might cue an ISR resource other than another FMV resource such as an spectral, MTI, or radar capability. In the Track mode, cross cue might also include the handoff between a broad area search resource and a resource with a higher spatial/spectral/temporal resolution needed to engage the track.

Flow of Events

Basic Path

Typical

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
5. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
8. Feed is cut over to new resource
9. Analyst confirms new feed

Alternate

Multilateration

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be

- cued
- 3. Sensor / mission manager / sensor operator of cued sensor indicates assent
- 4. Pointing vector is developed
- 6. Pointing vector is sent
- 6. Cued sensor slews to new vector
- 7. Cued resource indicates ready state
- 8. Feed is added to joint processing
- 9. Analyst confirms new feed
- 10. Multilateral analysis begins

Alternate

EC08 JMT

- 1. Invokes ISR Management
- 2. Supports NT-ISR
- 3. Supports MDA
- 4. Supports Persistent Surveillance

Pre-condition

Status: Approved

Resources are available to cross cue

To cross cue, sufficient resources must be available

Process

Status: Approved

Operator awareness

ISR operations managers and analysts must be aware that other ISR resources are available to support cross cueing

Process

Status: Approved

Permission to control

Operators must have permission to cue other resources

Process

Status: Approved

Availability of PED

Cued collection resources must have available PED resources

Process

Status: Approved

Means for effective hand-off

Some means to pass pointing vectors must exist

2.9.8 7.8 Track: Retrieve Findings

Retrieve previous findings from earlier Track operations. This is needed to retrieve the Track decision pedigree or review/examine what was Tracked and how it was Tracked from FMV or fused products. This use case also supports track history functions used for source and sink analysis.

Flow of Events

Basic Path

Typical

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media segment
3. FMV segment is spooled for review

Alternate

Offline pull

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media storage container as offline
3. Container is retrieved and loaded
4. FMV segment is spooled for review

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Material must have been recorded

To be retrieved, FMV products must have been recorded at some point

Pre-condition

Status: Approved

Recording is locatable

Recorded media must have been tagged, labeled, indexed, or catalogued so that it can be discovered again. Recording resource must also be online and available.

Pre-condition

Status: Approved

Recorded material format

Recorded material must be in a format compatible with existing playback/analysis capabilities

2.9.9 7.9 Track: Track Potential Targets

Using persistent and/or wide area coverage ISR resources, track objects in a field of view/detection that might represent potential tracks or targets.

Flow of Events

Basic Path

Typical

1. ISR resource scans large area
2. Objects of possible interest are detected
3. Higher resolution means or means from other discipline used to confirm interest
4. Potential targets enter tracking or targeting phase

Alternate

EC08 JMT

1. Invokes Persistent Surveillance
2. Supports NT-ISR
3. Supports MDA

Process

Status: Approved

ISR resources in place

Process

Status: Approved

ISR Resources correctly tuned

ISR resources are pointed at the right area and conditioned the right to detect expected activity

2.10 8 Dynamic Target Phase Use Cases

These use cases describe FMV interactions during the Target phase of dynamic targeting. The target(ing) phase is where specific targets are correlated with available intelligence and selected for possible engagement by appropriate effects.

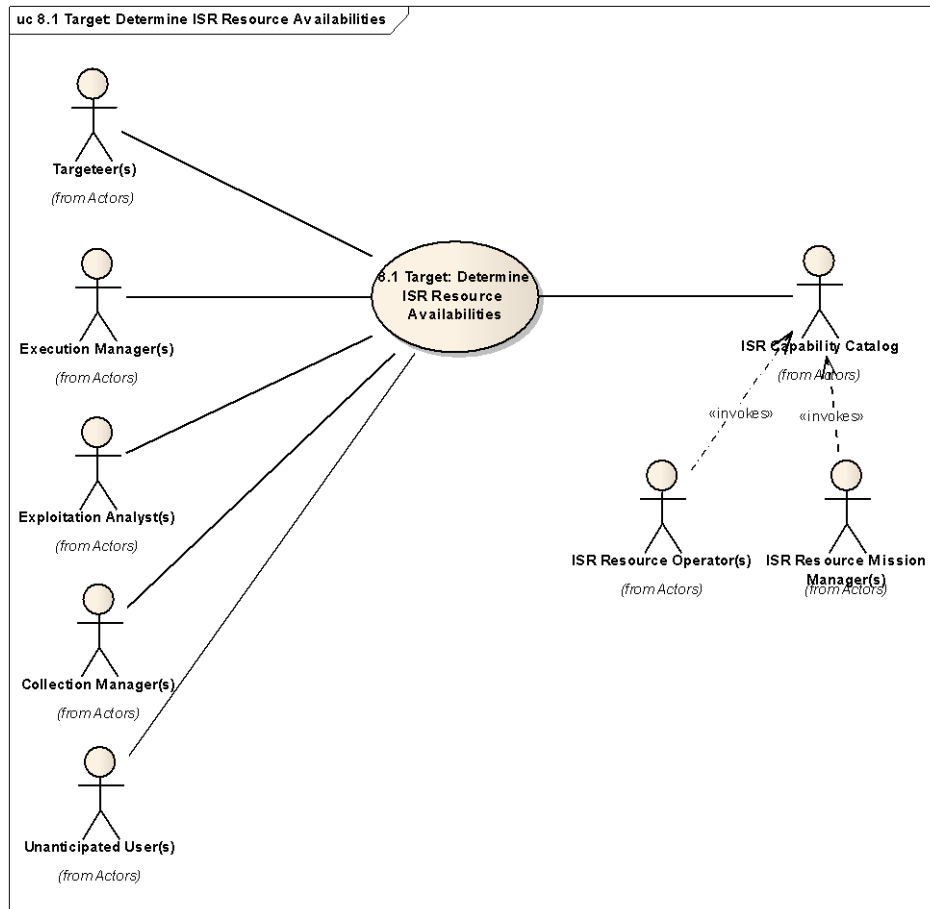


Figure 39: 8.1 Target: Determine ISR Resource Availabilities

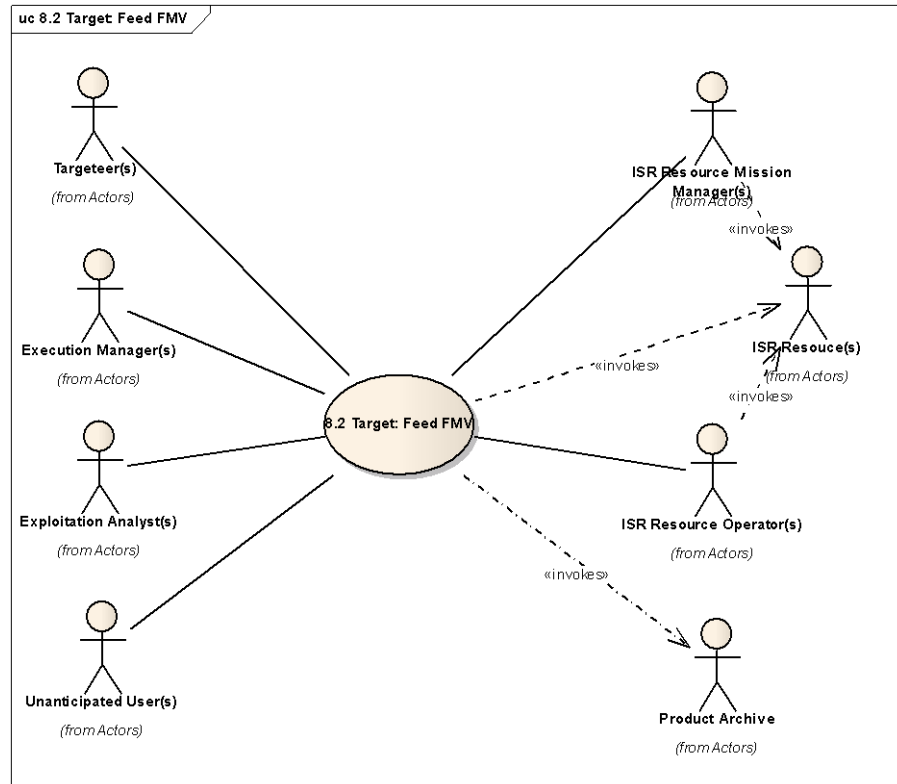


Figure 40: 8.2 Target: Feed FMV

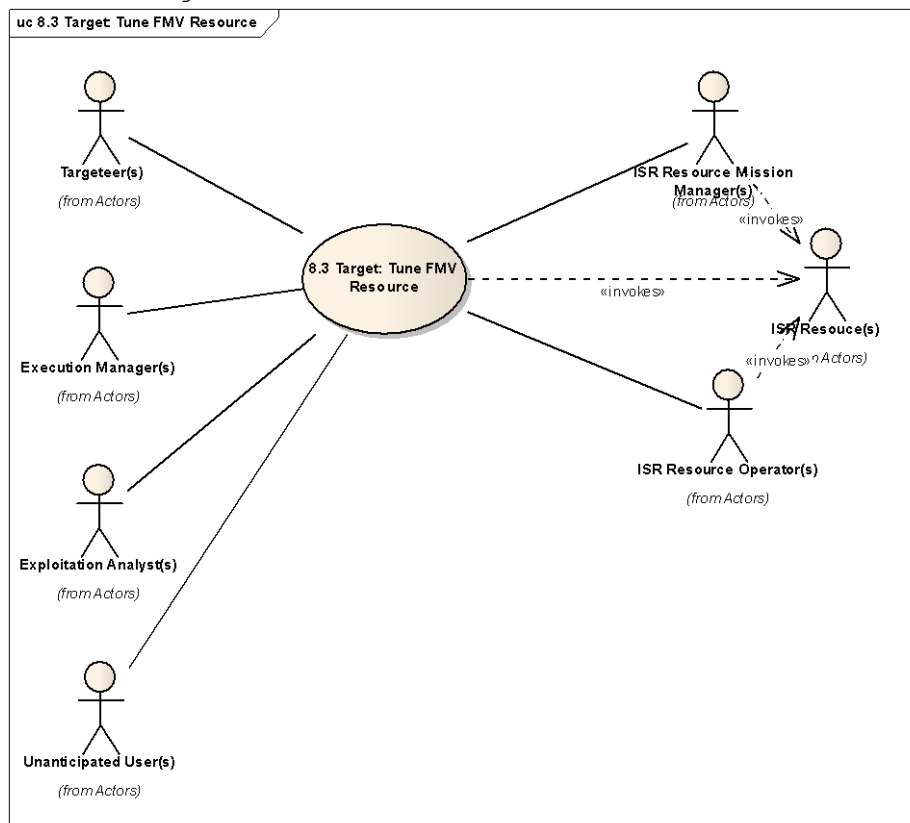


Figure 41: 8.3 Target: Tune FMV Resource

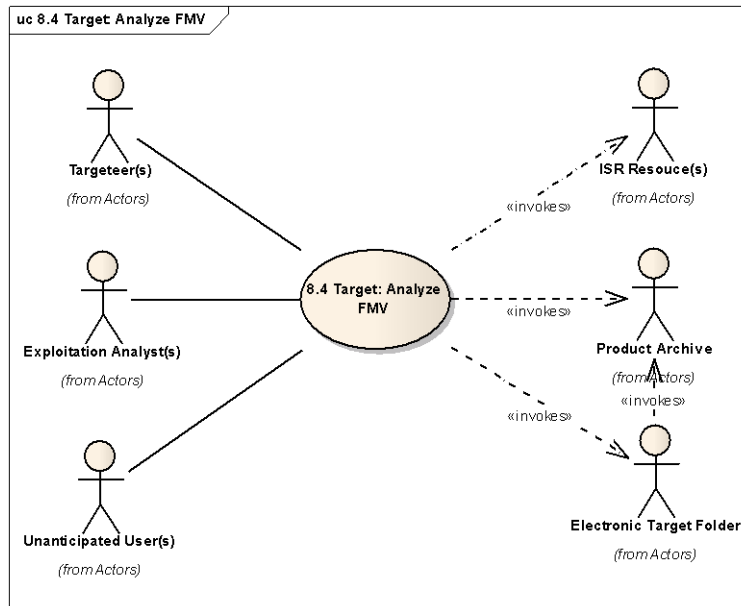


Figure 42: 8.4 Target: Analyze FMV

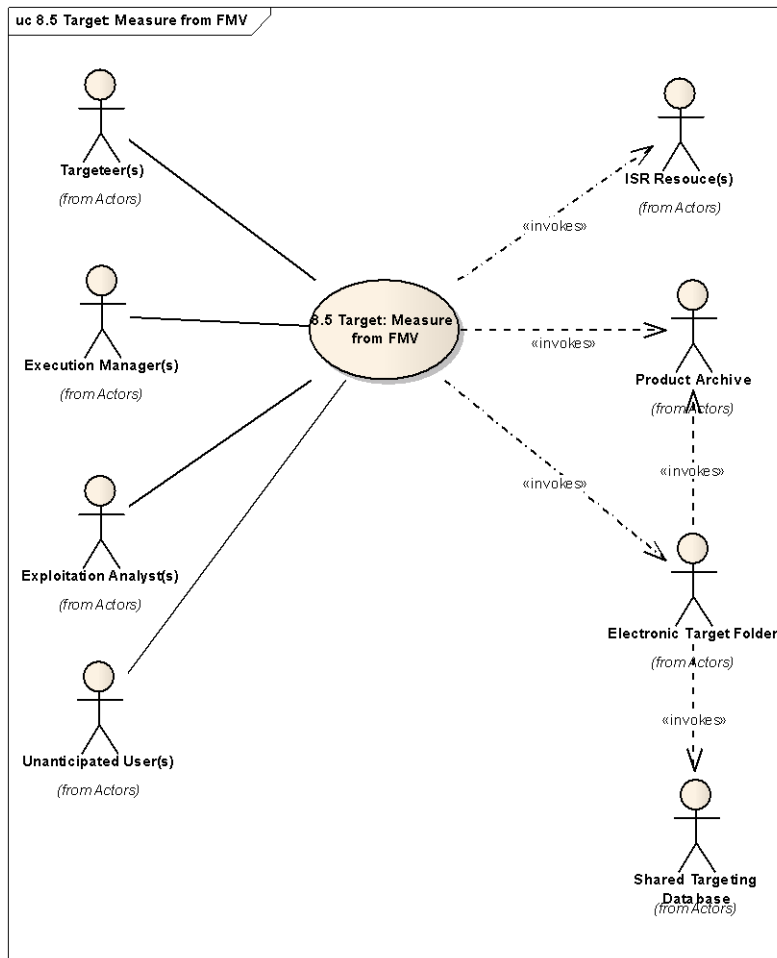


Figure 43: 8.5 Target: Measure from FMV

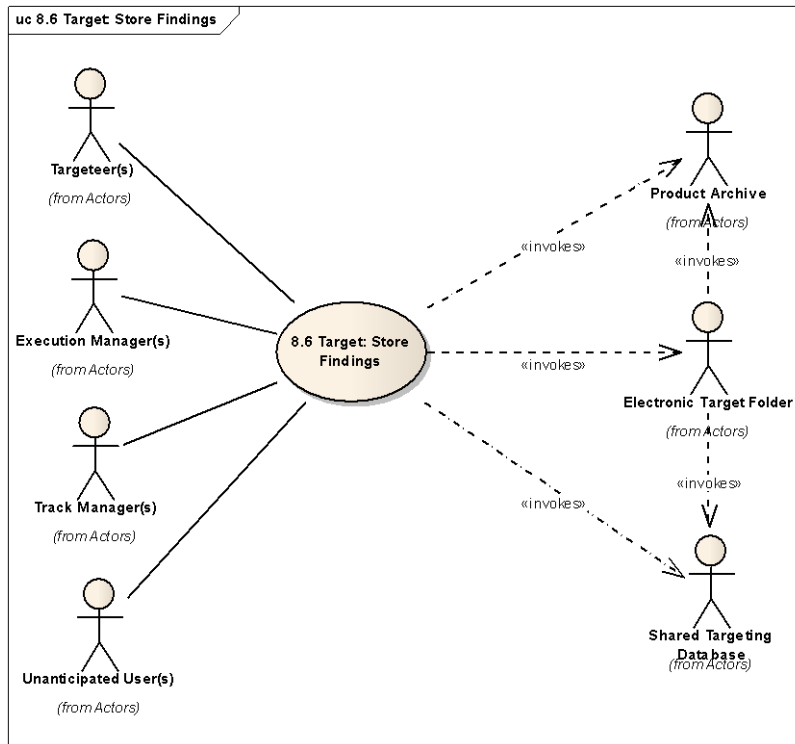


Figure 44: 8.6 Target: Store Findings

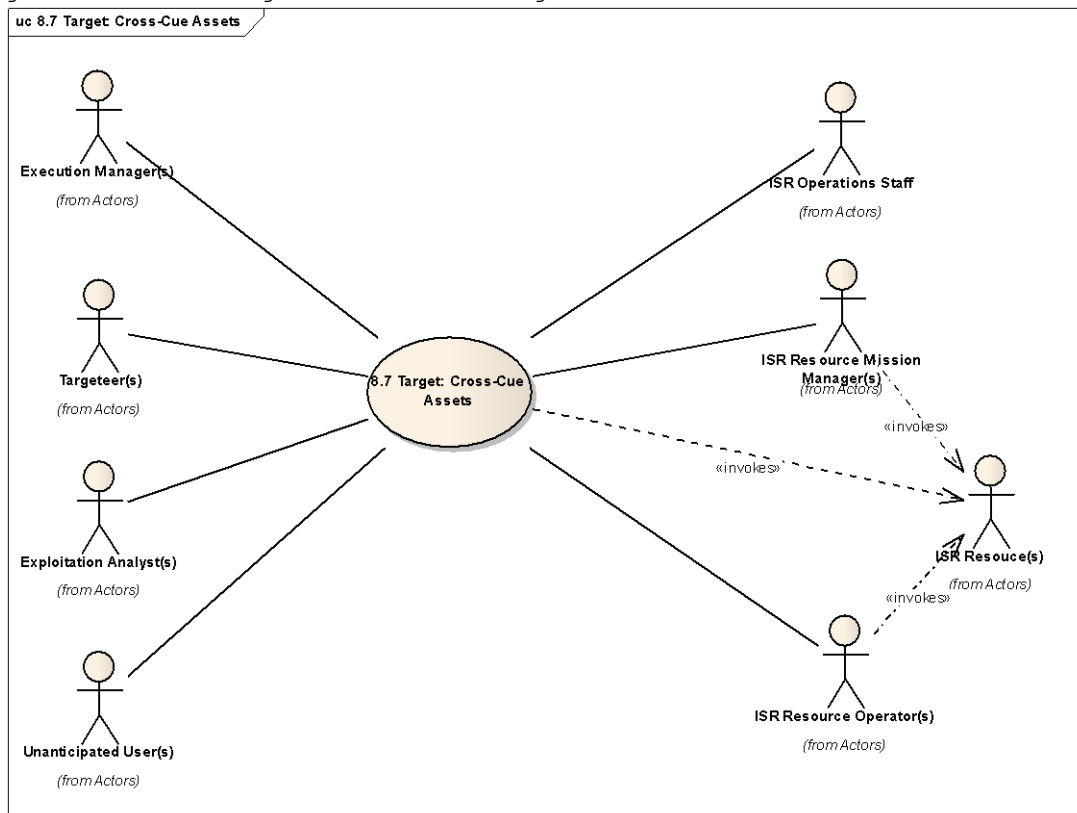


Figure 45: 8.7 Target: Cross-Cue Assets

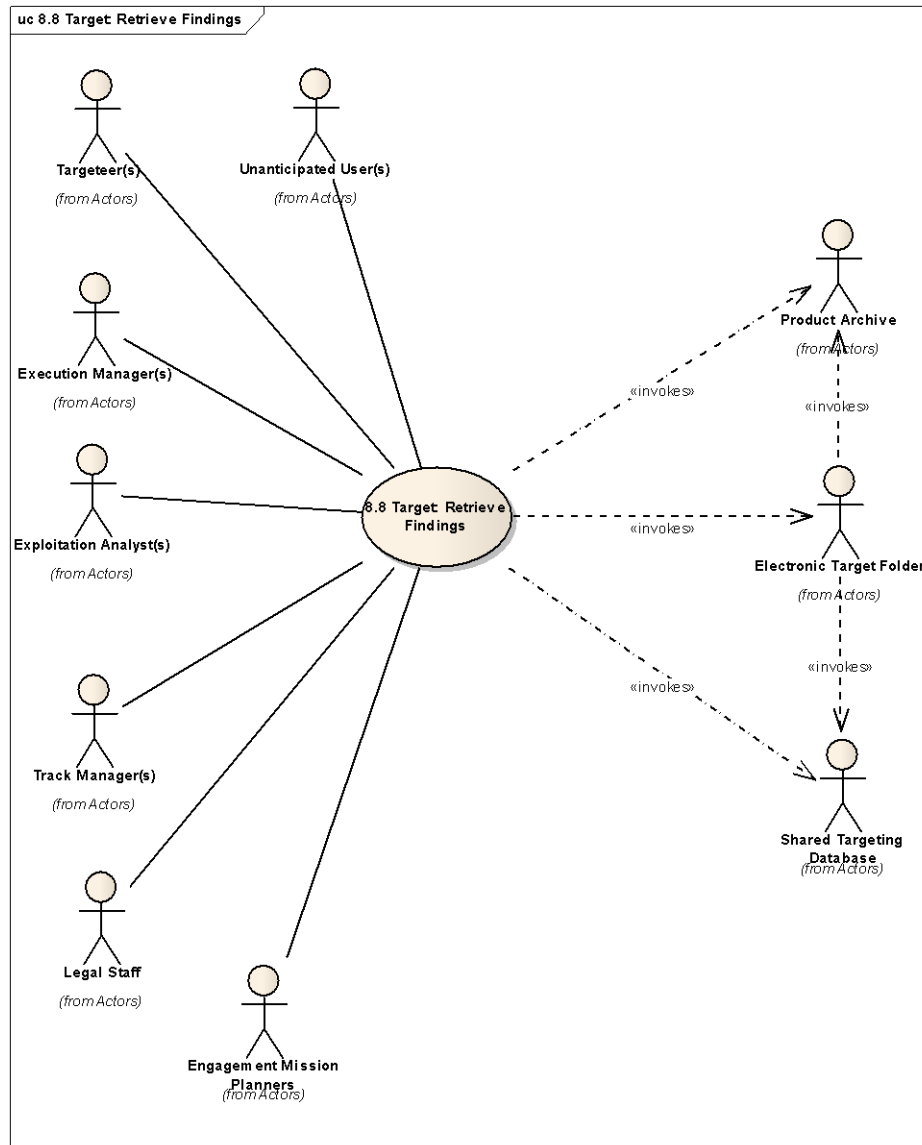


Figure 46: 8.8 Target: Retrieve Findings

2.10.1 8.1 Target: Determine ISR Resource Availabilities

Determines which ISR assets are available to support the targeting phase. Could be driven by spatial, temporal, or spectral capability constraints.

Flow of Events Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources are available to support execution plan
2. CM determines this information
3. CM advises planners of ISR resource availabilities that suit the

planning problem

Alternate

Automated

1. TST planners consult ISR resource availability service
2. TST planners select available resources that suit the execution plan

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance
5. Supports Joint Targeting

Pre-condition

Status: Approved

Theater ISR capabilities are known

Capabilities of the theater ISR collectors is known

Process

Status: Approved

Limitations

The search for asset availability may be constrained to a period of time, sensor tuning/discipline, spatial concern, ownership, reliability, or other constraints

Process

Status: Approved

Search also considers TPED assets if needed

Availability determination must include TPED elements if these are needed to support sensor use

2.10.2 8.2 Target: Feed FMV

FMV is fed from live sources or from storage to the who is attempting to perform targeting operations on potential targets. A sensor operator and/or analyst may be needed to assist with this activity. The execution manager may also be involved if the target is approaching execution.

Flow of Events

Basic Path

Typical

1. User connects to live feed
2. FMV feed streams to user

Alternate

Buffered feed

1. Comms, collector, or exploitation latency occurs
2. FMV product is temporarily buffered

Alternate

Archival feed

1. User desires to review FMV captured at an earlier time/date
2. Captured feed is located in archive

3. Captured feed is streamed to user from archive

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Resource is available

Live or archival resource is available to feed FMV

Process

Status: Approved

Resource remains available

Resource remains available throughout Target operation

2.10.3 8.3 Target: Tune FMV Resource

Perform adjustments to the FMV asset tuning. This could be spatial (pointing, slewing, zooming), spectral, or some other control parameter adjustment. During the targeting phase, tuning would likely be needed to follow, maintain track on, update status of, or reacquire potential targets as well as to explore collocated area for items relevant to collateral damage estimation.

Flow of Events

Basic Path

Typical

1. Targeteer or Analyst requests change in resource tuning parameters
2. Sensor operator, mission manager, or resource validates request
3. Sensor operator, mission manager, or resource performs request
4. Feedback is sent to requestor

Alternate

Lost target

1. Repointing resource loses target track
2. Sensor operator attempts to reacquire target
3. Targeteer notified

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance
5. Supports Joint Targeting

Pre-condition

Status: Approved

Resource is tunable

Not all resources will offer tunable parameters

Process

Status: Approved

User has permission to tune resource

User must have permission to alter resource tuning

2.10.4 8.4 Target: Analyze FMV

Analyze contents of live or recorded FMV feed. This could include contrast / brightness adjustment, feature extraction, replay, stop motion, slow motion etc. In the case of targeting operations, the analyst will be trying to follow potential targets and in some cases discover more about them. The targeteer may also use this analysis to make weaponeering calls and to approximate positions for engagement options. Targeteers will also likely analyze the local environment as a collateral damage precaution. Inability to reacquire lost targets will revert to the Fix or Track phases.

Flow of Events

Basic Path

Typical

1. Analyst controls presentation of FMV product
2. Analyst records findings possibly into an electronic target folder

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Process

Status: Approved

Exploitation support data are present

ESD may need to be present in the stream to effectively analyze the FMV feed.

2.10.5 8.5 Target: Measure from FMV

Allow analyst to measure some quantity from the FMV feed/replay. In the case of targeting, this is usually to acquire an updated geoposition to relay to an execution asset or to update the electronic target folder.

Flow of Events

Basic Path

Typical

1. Analyst freezes feed
2. Analyst measures location or dimension
3. Analyst is given correct value for measurement
4. Targeteer relays or records measurement

Alternate

Moving measurement

1. Analyst controls feed display rate
2. Analyst measures a value against moving frames (e.g., velocity)
3. Analyst is provided with measured value

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Process

Status: Approved

Presence of ESD in feed

This use case relies on some form of ESD metadata to be present in the feed so that accurate positional and dimensional information can be extracted from the product.

2.10.6 8.6 Target: Store Findings

Place contents of feed or analytical sub-products into some form of archive for later review or retrieval. Store target materials in electronic target folders and structured target intelligence in shared targeting database.

Flow of Events

Basic Path

Typical

1. Analyst indicates FMV segment and analytical products to be saved
2. Analyst initiates storage process
3. Materials are stored on media

Basic Path

Database update

Analyst updates location of track in shared target database

Alternate

Automated

All FMV take and analytical operations are stored

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Media availability

Media must be available to record or store findings

Pre-condition

Status: Approved

Target database access

If writing to Target database, need access to this item

Process

Status: Approved

Media capacity

Sufficient media must exist to store selected FMV feed

Process

Status: Approved

Target database permission

Will need permission to write to a shared Target database

2.10.7 8.7 Target: Cross-Cue Assets

Cause sensors to multilaterate on a designated target. This is often needed to hand-off a target between collection resources during targeting operations. This activity might cue an ISR resource other than another FMV resource such as an spectral, MTI, or radar capability. In the targeting mode, cross cue might also include the handoff between a broad area search resource and a resource with a higher spatial/spectral/temporal resolution needed to engage the track with precision.

Flow of Events**Basic Path****Typical**

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
5. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
8. Feed is cut over to new resource
9. Analyst confirms new feed

Alternate**Multilateration**

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
6. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
8. Feed is added to joint processing
9. Analyst confirms new feed

10. Multilateral analysis begins

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance
5. Supports Joint Targeting

Pre-condition

Status: Approved

Resources are available to cross cue

To cross cue, sufficient resources must be available

Process

Status: Approved

Operator awareness

ISR operations managers and analysts must be aware that other ISR resources are available to support cross cueing

Process

Status: Approved

Permission to control

Operators must have permission to cue other resources

Process

Status: Approved

Availability of PED

Cued collection resources must have available PED resources

Process

Status: Approved

Means for effective hand-off

Some means to pass pointing vectors must exist

2.10.8 8.8 Target: Retrieve Findings

Retrieve previous findings from earlier tracking and targeting operations. This is needed to retrieve the targeting decision pedigree or review/examine what was targeted and how it was targeted from FMV or fused products. This use case also supports target and track history functions used for source and sink analysis and further target development. This use case serves many actors as targeting information is needed by many execution functions, it is reasonable to assume that many of the actors are unanticipated.

Flow of Events

Basic Path

Typical

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media segment

3. FMV segment is spooled for review

Basic Path

Database pull

1. Target information is pulled from database using some form of query such as target ID (e.g., BE Number), area of coverage etc.
2. Results are displayed

Alternate

Offline pull

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media storage container as offline
3. Container is retrieved and loaded
4. FMV segment is spooled for review

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Material must have been recorded

To be retrieved, FMV products must have been recorded at some point

Pre-condition

Status: Approved

Recording is locatable

Recorded media must have been tagged, labeled, indexed, or catalogued so that it can be discovered again. Recording resource must also be online and available.

Pre-condition

Status: Approved

Recorded material format

Recorded material must be in a format compatible with existing playback/analysis capabilities

Pre-condition

Status: Approved

Database is accessible

To retrieve targeting info placed in the targeting database, it must be accessible to consumers

Pre-condition

Status: Approved

Target Folders Accessible

To retrieve targeting info placed in the target folders, they must be accessible to consumers

2.11 9 Dynamic Engage Phase Use Cases

These use cases describe FMV interactions during the Engage phase of dynamic targeting. During the engage phase, effects selected towards specific targets are enacted often leading directly to re-targeting and/or effects assessment.

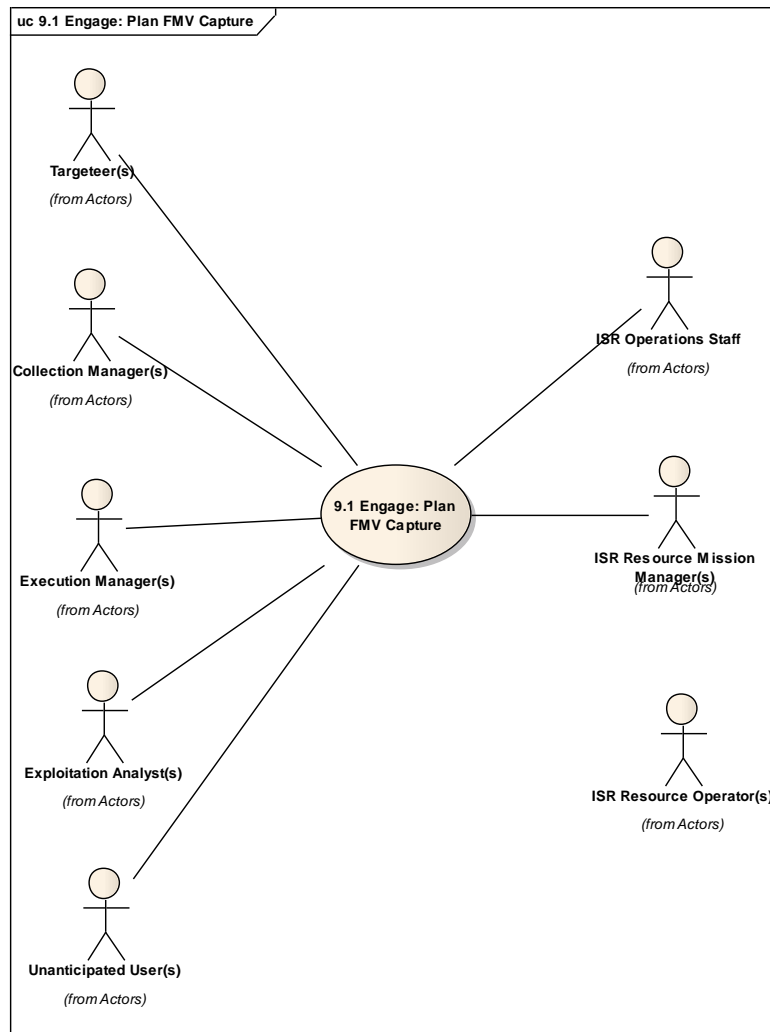


Figure 47: 9.1 Engage: Plan FMV Capture

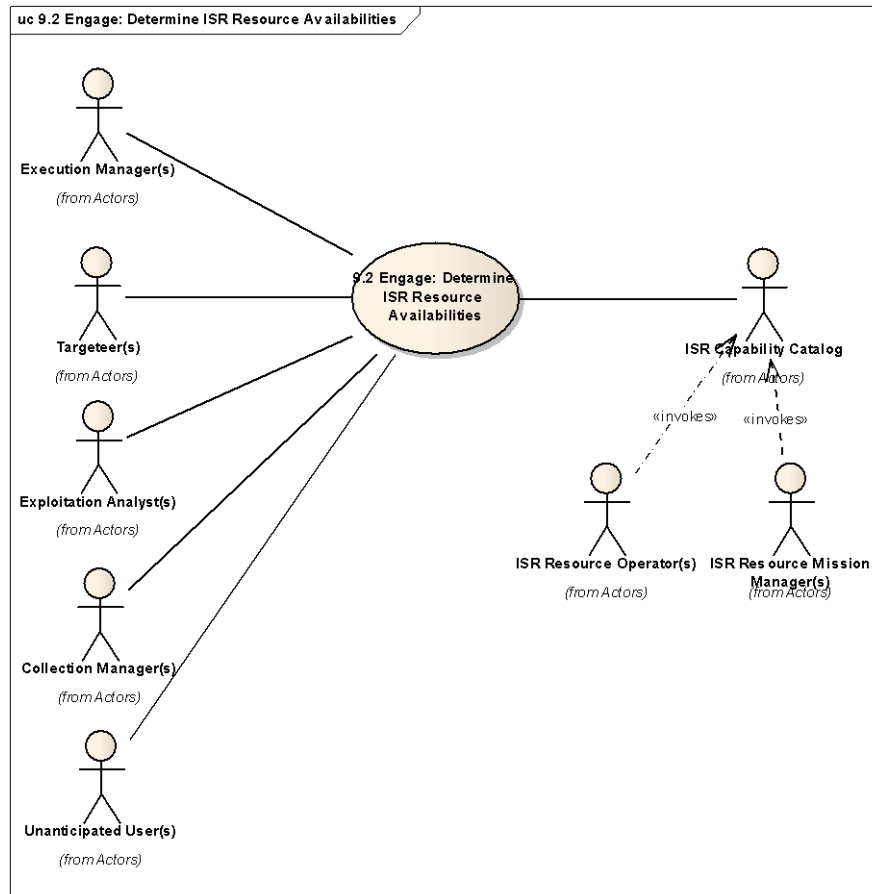


Figure 48: 9.2 Engage: Determine ISR Resource Availabilities

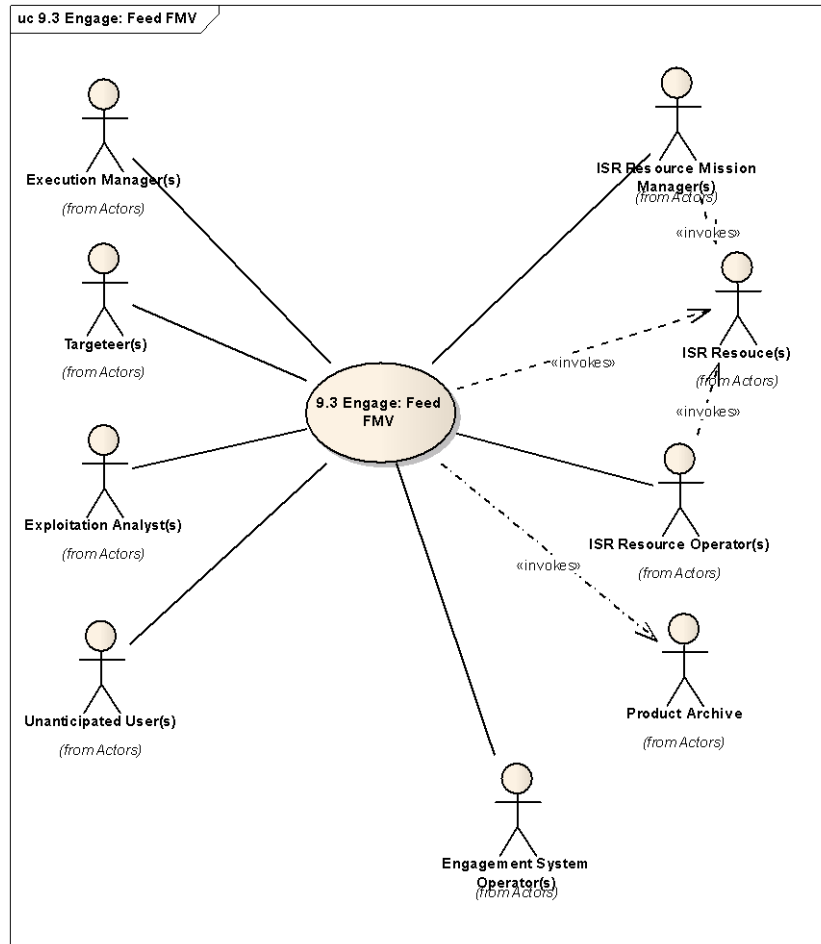


Figure 49: 9.3 Engage: Feed FMV

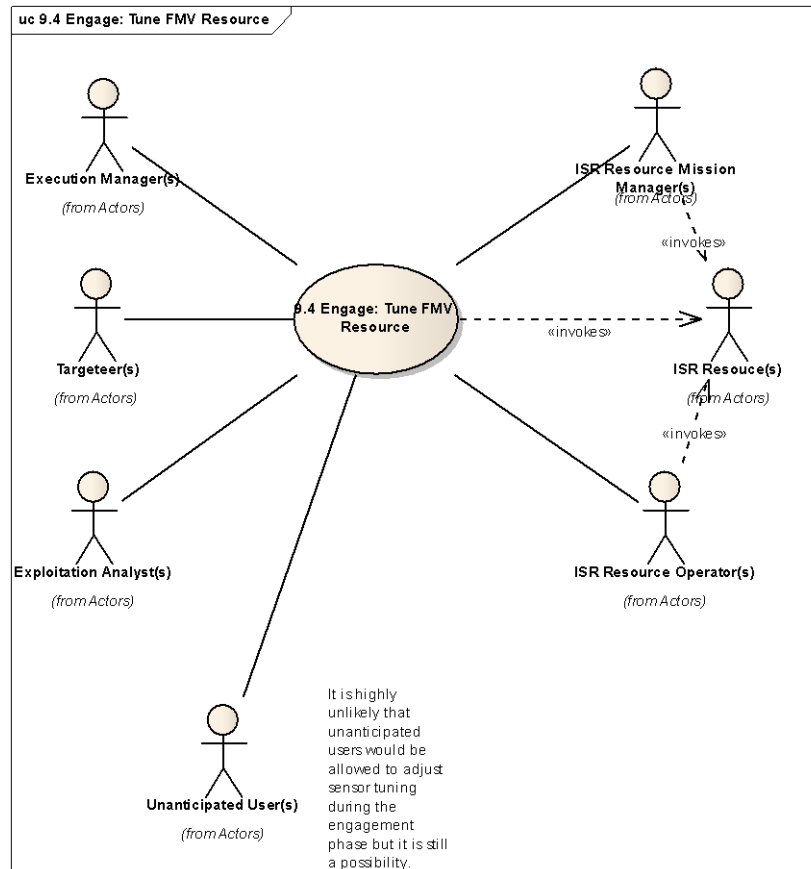


Figure 50: 9.4 Engage: Tune FMV Resource

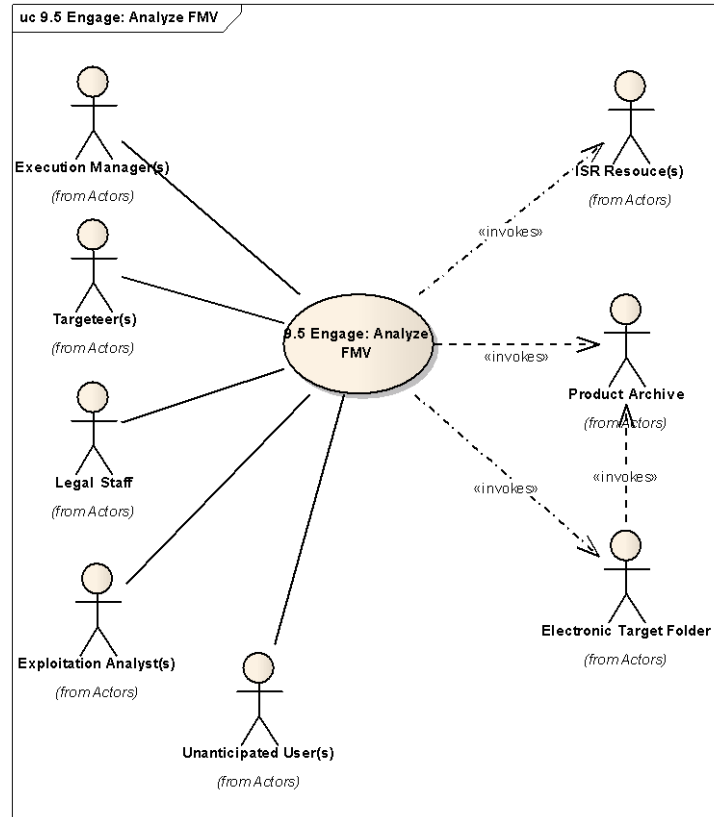


Figure 51: 9.5 Engage: Analyze FMV

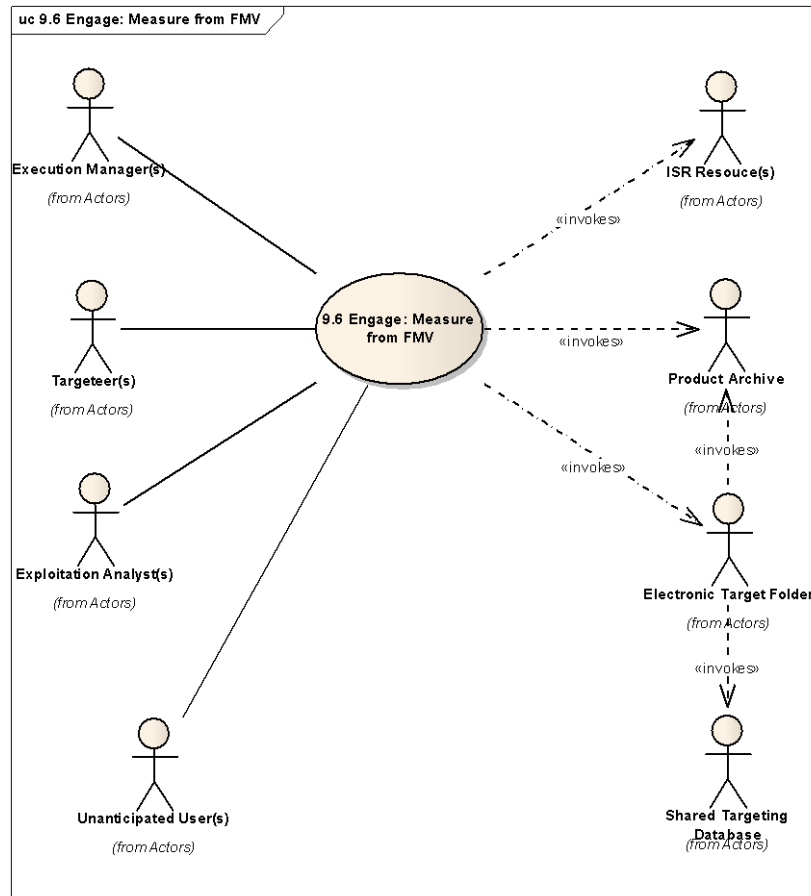


Figure 52: 9.6 Engage: Measure from FMV

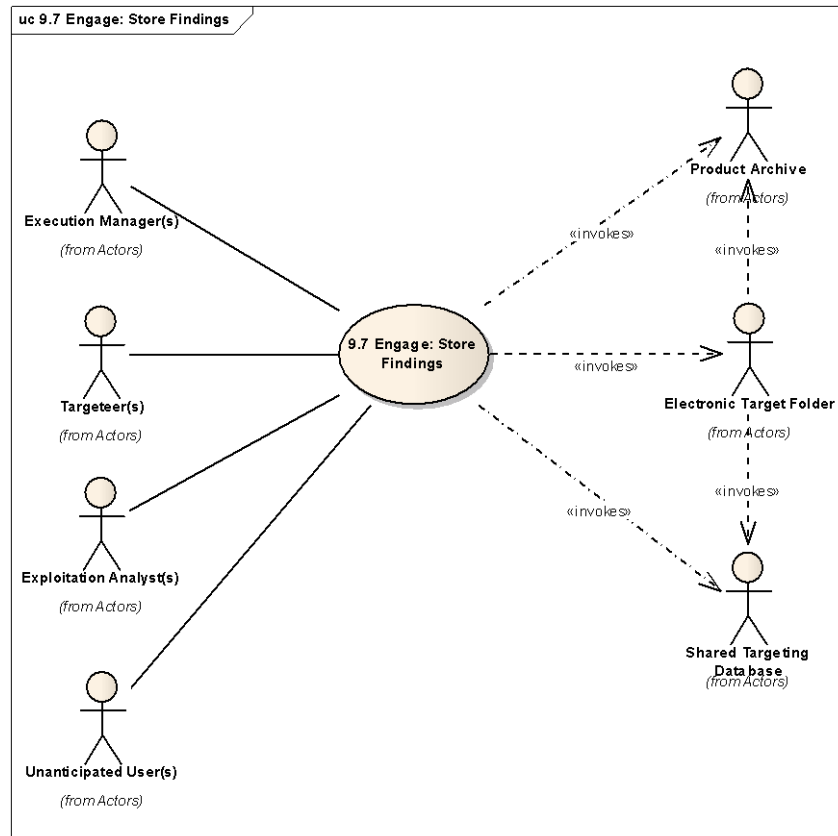


Figure 53: 9.7 Engage: Store Findings

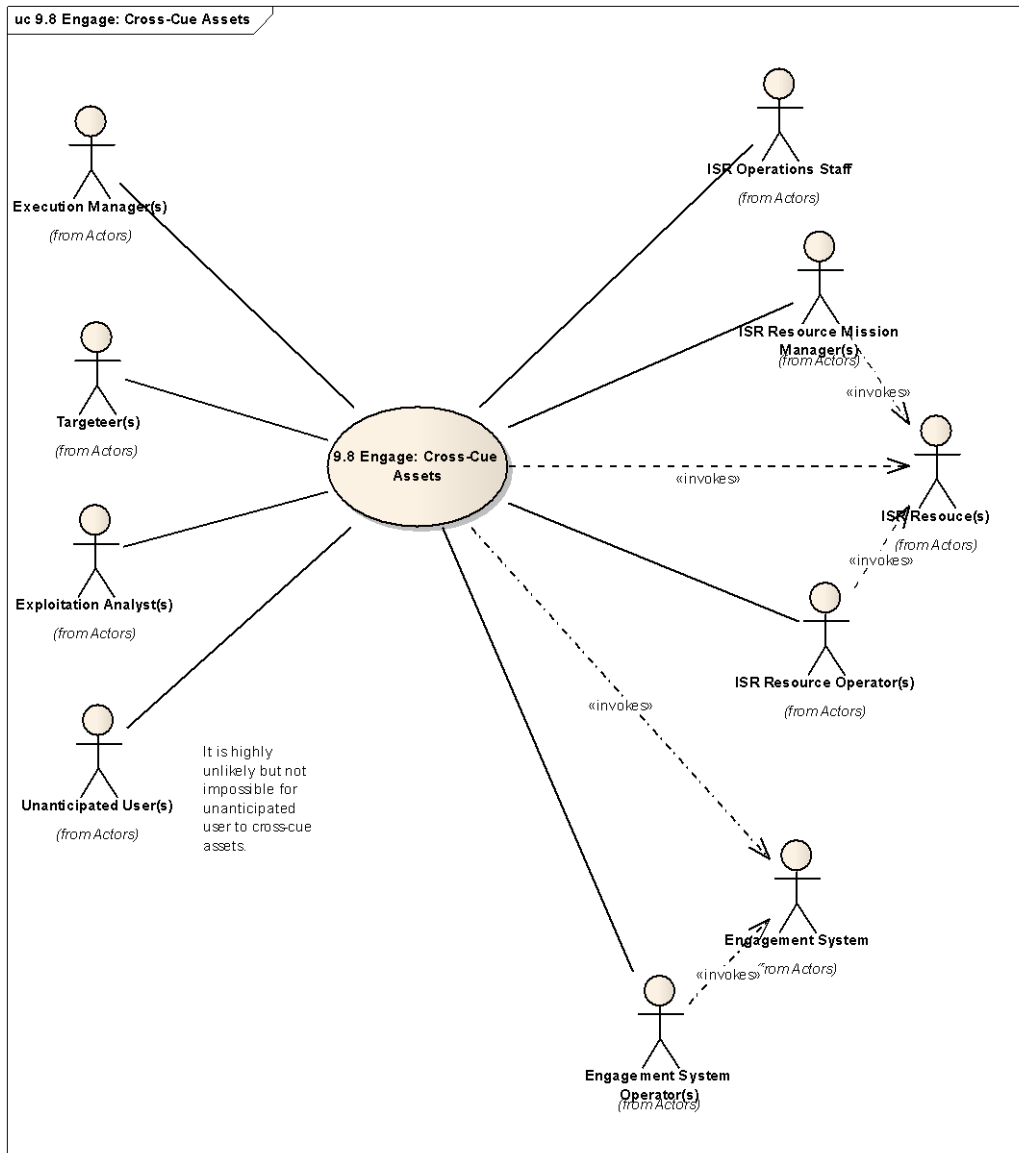


Figure 54: 9.8 Engage: Cross-Cue Assets

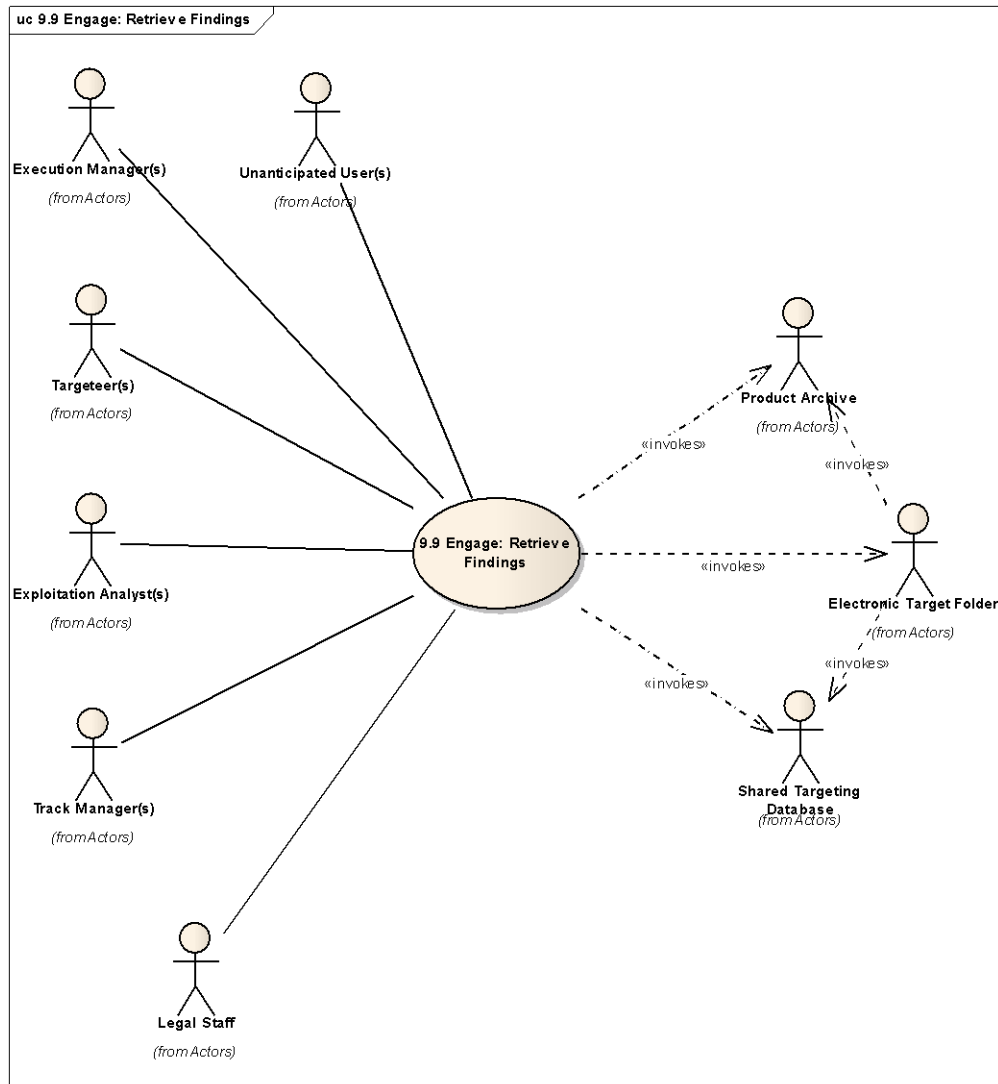


Figure 55: 9.9 Engage: Retrieve Findings

2.11.1 9.1 Engage: Plan FMV Capture

Plan for the FMV CPED of planned engagement activities. This may result in tasking/retasking of underway ISR assets.

Flow of Events

Basic Path

Typical

1. Engagement team works with collection managers, ISR asset mission managers, and/or ISR resource operators to ensure system will capture intended effects of planned engagements.

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA

4. Supports Persistent Surveillance
5. Supports Joint Targeting

Pre-condition *Status: Approved*

Capabilities of ISR platforms are known

The capability of platforms is known prior to planning their use

Pre-condition *Status: Approved*

FMV capabilities exist and are available

In order to plan FMV capture, one or more platforms capable of performing FMV capture must exist

Pre-condition *Status: Approved*

FMV TPED resources exist and are available

In order to plan for FMV capture, FMV TPED resources must exist and must have windows of availability

Post-condition *Status: Approved*

FMV capture is planned

Post-condition *Status: Approved*

FMV TPED is planned

2.11.2 9.2 Engage: Determine ISR Resource Availabilities

Determines which ISR assets are available to support the engagement phase. Could be driven by spatial, temporal, or spectral capability constraints. Even though ISR is typically planned for this phase, it is still prudent to determine if anything else is now available.

Flow of Events

Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources are available to support execution plan
2. CM determines this information
3. CM advises planners of ISR resource availabilities that suit the planning problem

Alternate

Automated

1. TST planners consult ISR resource availability service
2. TST planners select available resources that suit the execution plan

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance
5. Supports Joint Targeting

Pre-condition

Status: Approved

Theater ISR capabilities are known

Capabilities of the theater ISR collectors is known

Process

Status: Approved

Limitations

The search for asset availability may be constrained to a period of time, sensor tuning/discipline, spatial concern, ownership, reliability, or other constraints

Process

Status: Approved

Search also considers TPED assets if needed

Availability determination must include TPED elements if these are needed to support sensor use

2.11.3 9.3 Engage: Feed FMV

FMV is fed from live sources to the engagement manager and targeteers (or archive if reviewing engagement). A sensor operator and/or analyst may be needed to assist with this activity. Many other will join to observe as the target approaches execution. It is also possible to feed FMV to the operator of an engagement system.

Flow of Events

Basic Path

Typical

1. User connects to live feed
2. FMV feed streams to user

Alternate

Buffered feed

1. Comms, collector, or exploitation latency occurs
2. FMV product is temporarily buffered

This may cause problems during execution

Alternate

Archival feed

1. User desires to review FMV captured at an earlier time/date
2. Captured feed is located in archive
3. Captured feed is streamed to user from archive

Alternate

EC08 JMT

1. Supports NT-ISR

2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Resource is available

Live or archival resource is available to feed FMV

Process

Status: Approved

Resource remains available

Resource remains available throughout the engagement operation

2.11.4 9.4 Engage: Tune FMV Resource

Perform adjustments to the FMV asset tuning. This could be spatial (pointing, slewing, zooming), spectral, or some other control parameter adjustment. During the engagement phase, tuning would likely be needed to follow, maintain track on, update status of, or reacquire targets as well as to explore collocated area for items relevant to collateral damage estimation. In some systems the FMV feed is used to direct the engagement so tuning must be performed with skill.

Flow of Events

Basic Path

Typical

1. Execution Manager or Analyst requests change in resource tuning parameters
2. Sensor operator, mission manager, or resource validates request
3. Sensor operator, mission manager, or resource performs request
4. Feedback is sent to requestor

Alternate

Lost target

1. Repointing resource loses target track
2. Sensor operator attempts to reacquire target
3. Engagement Manager and Targeteer may participate

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance
5. Supports Joint Targeting

Pre-condition

Status: Approved

Resource is tunable

Not all resources will offer tunable parameters

Process

Status: Approved

User has permission to tune resource

User must have permission to alter resource tuning

2.11.5 9.5 Engage: Analyze FMV

Analyze contents of live or recorded FMV feed. This could include contrast / brightness adjustment, feature extraction, replay, stop motion, slow motion etc. In the case of engagement operations, the operator will be trying to follow potential targets and in some cases discover more about them. The targeteer or execution manager may also use this analysis to make weaponeering calls and to approximate delivery positions for engagement options. Targeteers will also likely continue to analyze the local environment as a collateral damage precaution. Inability to reacquire lost targets will revert to the Fix or Track phases.

Flow of Events

Basic Path

Typical

1. Analyst controls presentation of FMV product
2. Analyst records findings possibly into an electronic target folder

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Process

Status: Approved

Exploitation support data are present

ESD may need to be present in the stream to effectively analyze the FMV feed.

2.11.6 9.6 Engage: Measure from FMV

Allow operator to measure some quantity from the FMV feed/replay. In the case of execution this is typically a updated geoposition to relay to an execution asset. The FMV mensuration may lead to a precise mensuration on a controlled product like DPPDB.

Flow of Events

Basic Path

Typical

1. Analyst freezes feed
2. Analyst measures location or dimension
3. Analyst is given correct value for measurement
4. Targeteer or Execution Manager relays or records measurement

Alternate

Moving measurement

1. Analyst controls feed display rate
2. Analyst measures a value against moving frames (e.g., velocity)
3. Analyst is provided with measured value

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Process

Status: Approved

Presence of ESD in feed

This use case relies on some form of ESD metadata to be present in the feed so that accurate positional and dimensional information can be extracted from the product.

2.11.7 9.7 Engage: Store Findings

Place contents of feed or analytical sub-products into some form of archive for later review or retrieval. Store target materials in electronic target folders and structured target intelligence in shared targeting database. As this feed will likely include the engagement, it is essential that full quality provisions are made.

Flow of Events

Basic Path

Typical

1. Analyst indicates FMV segment and analytical products to be saved
2. Analyst initiates storage process
3. Materials are stored on media

Basic Path

Database update

Analyst updates location of track in shared target database

Alternate

Automated

All FMV take and analytical operations are stored

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Media availability

Media must be available to record or store findings

Pre-condition	<i>Status: Approved</i>
Target database access	
If writing to Target database, need access to this item	
Process	<i>Status: Approved</i>
Media capacity	
Sufficient media must exist to store selected FMV feed	
Process	<i>Status: Approved</i>
Target database permission	
Will need permission to write to a shared Target database	

2.11.8 9.8 Engage: Cross-Cue Assets

Cause sensors to multilaterate on a designated target. This is often needed to hand-off a target between collection resources during targeting operations. This activity might cue an ISR resource other than another FMV resource such as an spectral, MTI, or radar capability. During the engagement process the cross cue function might also include the handoff between an ISR resource and an engagement system.

Flow of Events

Basic Path

Typical

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
5. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
8. Feed is cut over to new resource
9. Analyst confirms new feed

Alternate

Engagement system cue

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of engagement to be cued
3. Engagement system or engagement system operator of cued system indicates assent
4. Pointing vector is developed
5. Pointing vector is sent
6. Engagement system engages the target

Alternate

Multilateration

1. Analyst / operator gains awareness of other cueable resources

2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
6. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
8. Feed is added to joint processing
9. Analyst confirms new feed
10. Multilateral analysis begins

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports MDA
4. Supports Persistent Surveillance
5. Supports Joint Targeting

Pre-condition

Status: Approved

Resources are available to cross cue

To cross cue, sufficient resources must be available

Process

Status: Approved

Operator awareness

Execution and ISR operations managers and analysts must be aware that other ISR and engagement system resources are available to support cross cueing

Process

Status: Approved

Permission to control

Operators must have permission to cue other resources

Process

Status: Approved

Availability of PED

Cued collection resources must have available PED resources

Process

Status: Approved

Means for effective hand-off

Some means to pass pointing vectors must exist

2.11.9 9.9 Engage: Retrieve Findings

Retrieve previous findings from the entire engagement sequence possibly from earlier tracking and targeting operations. This may take the form of engagement review for immediate restrike or continuance of effects. This use case serves many actors as engagement information is needed by many execution functions, it is reasonable to assume that many of the actors are unanticipated.

Flow of Events

Basic Path

Typical

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media segment
3. FMV segment is spooled for review

Basic Path

Database pull

1. Target information is pulled from database using some form of query such as target ID (e.g., BE Number), area of coverage etc.
2. Results are displayed

Alternate

Offline pull

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media storage container as offline
3. Container is retrieved and loaded
4. FMV segment is spooled for review

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports MDA
3. Supports Persistent Surveillance
4. Supports Joint Targeting

Pre-condition

Status: Approved

Material must have been recorded

To be retrieved, FMV products must have been recorded at some point

Pre-condition

Status: Approved

Recording is locatable

Recorded media must have been tagged, labeled, indexed, or catalogued so that it can be discovered again. Recording resource must also be online and available.

Pre-condition

Status: Approved

Recorded material format

Recorded material must be in a format compatible with existing playback/analysis capabilities

Pre-condition

Status: Approved

Database is accessible

To retrieve targeting info placed in the targeting database, it must be accessible to consumers

Pre-condition

Status: Approved

Target Folders Accessible

To retrieve targeting info placed in the target folders, they must be accessible to consumers

2.12 10 Dynamic Assess Phase Use Cases

These use cases describe FMV interactions during the Assess phase of dynamic targeting. The assess phase has the responsibility to determine whether engagement effects were effective or not.

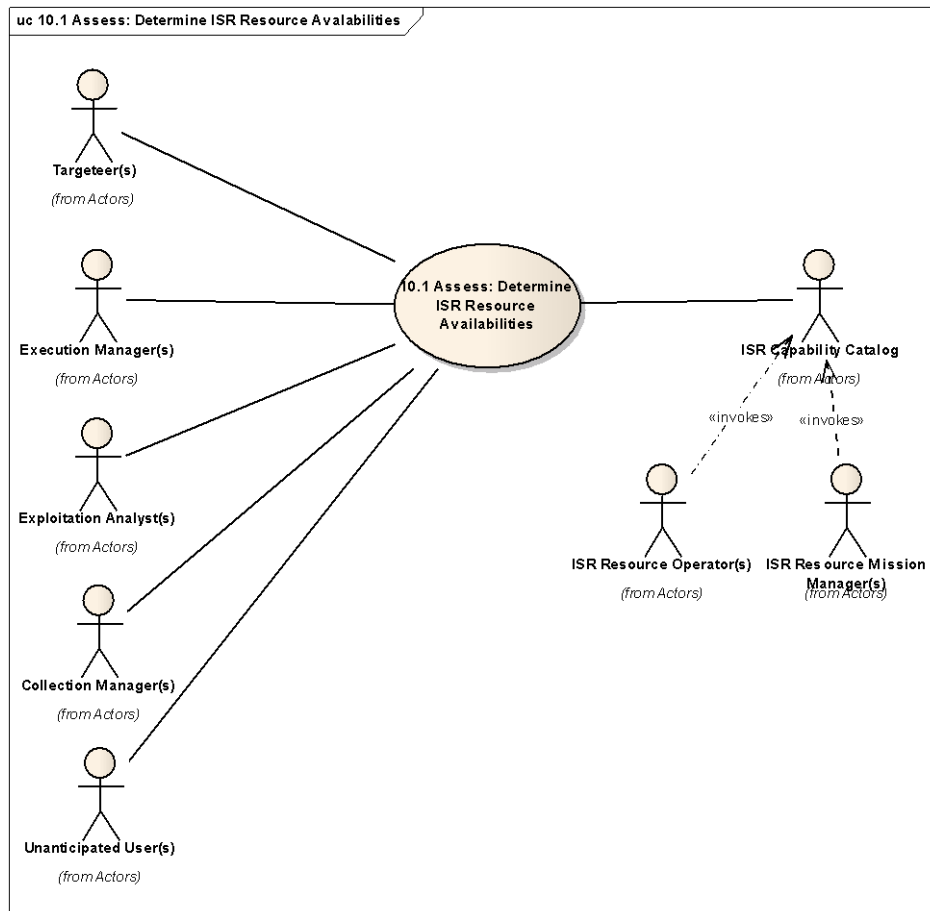


Figure 56: 10.1 Assess: Determine ISR Resource Availabilities

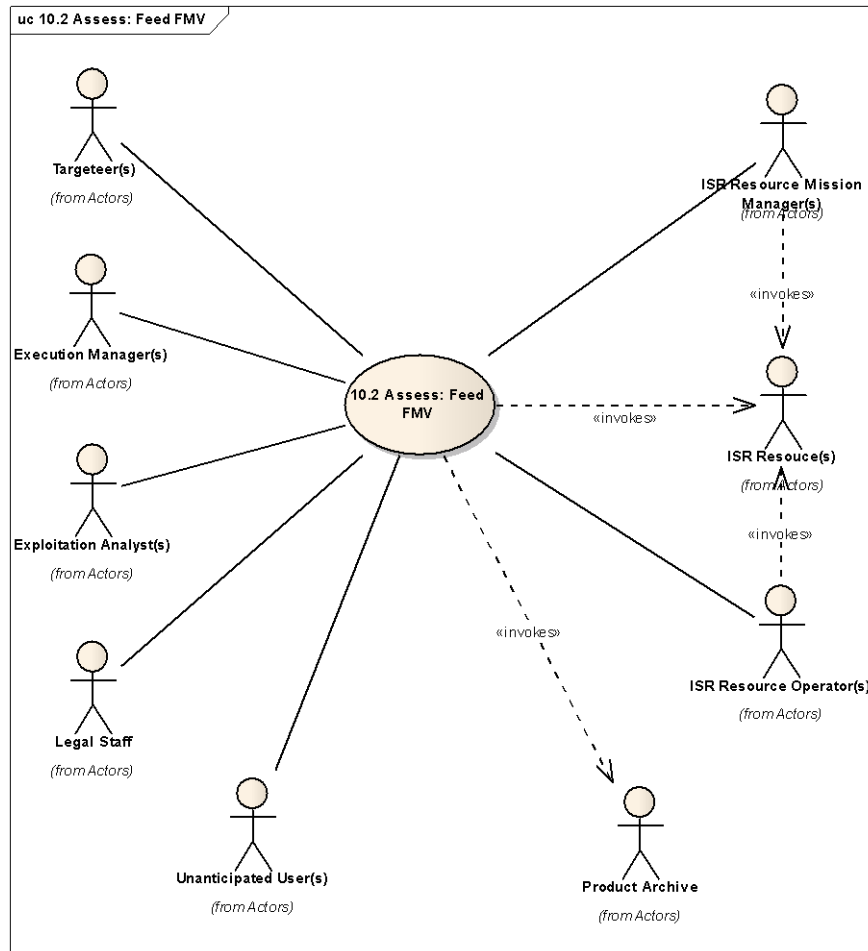


Figure 57: 10.2 Assess: Feed FMV

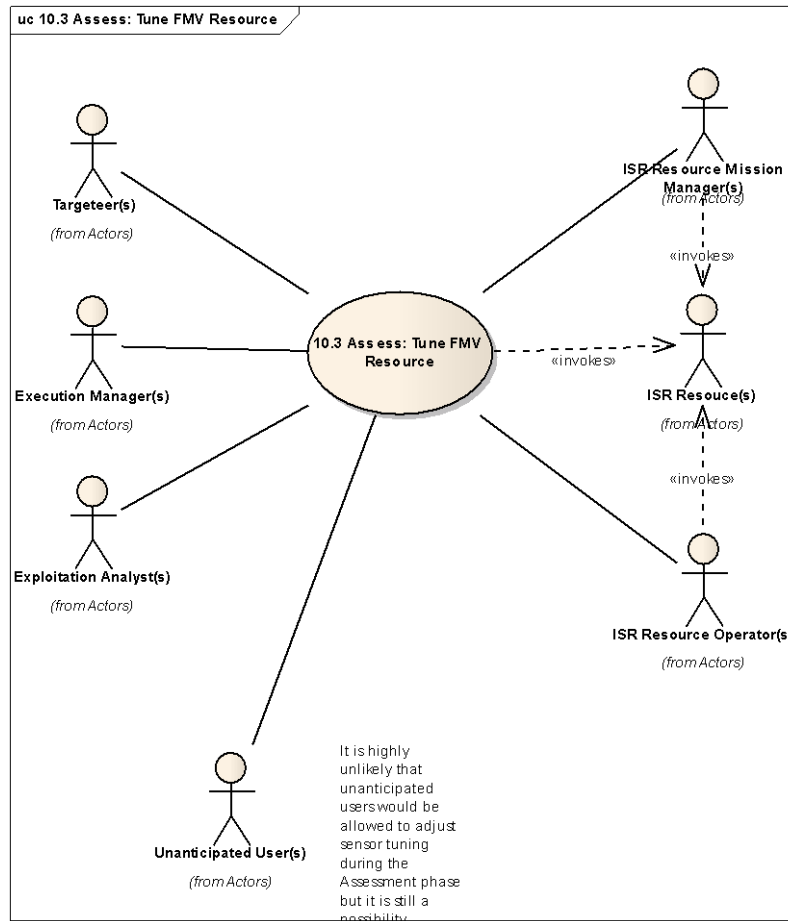


Figure 58: 10.3 Assess: Tune FMV Resource

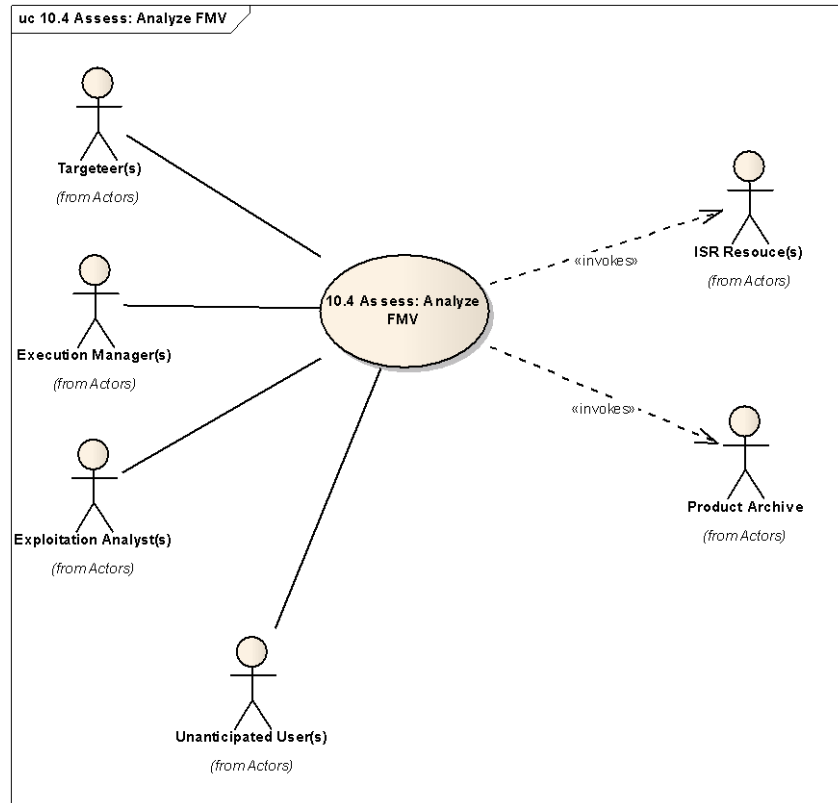


Figure 59: 10.4 Assess: Analyze FMV

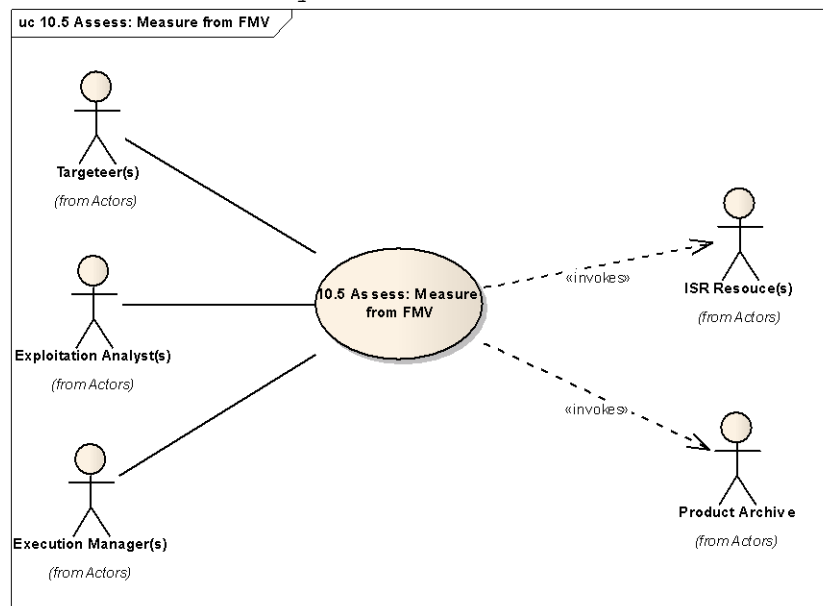


Figure 60: 10.5 Assess: Measure from FMV

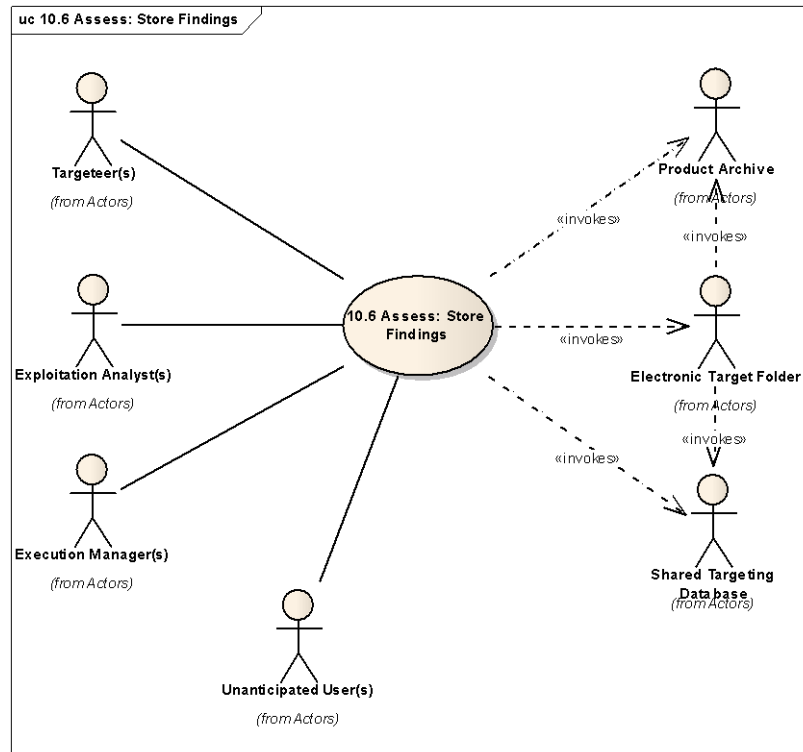


Figure 61: 10.6 Assess: Store Findings

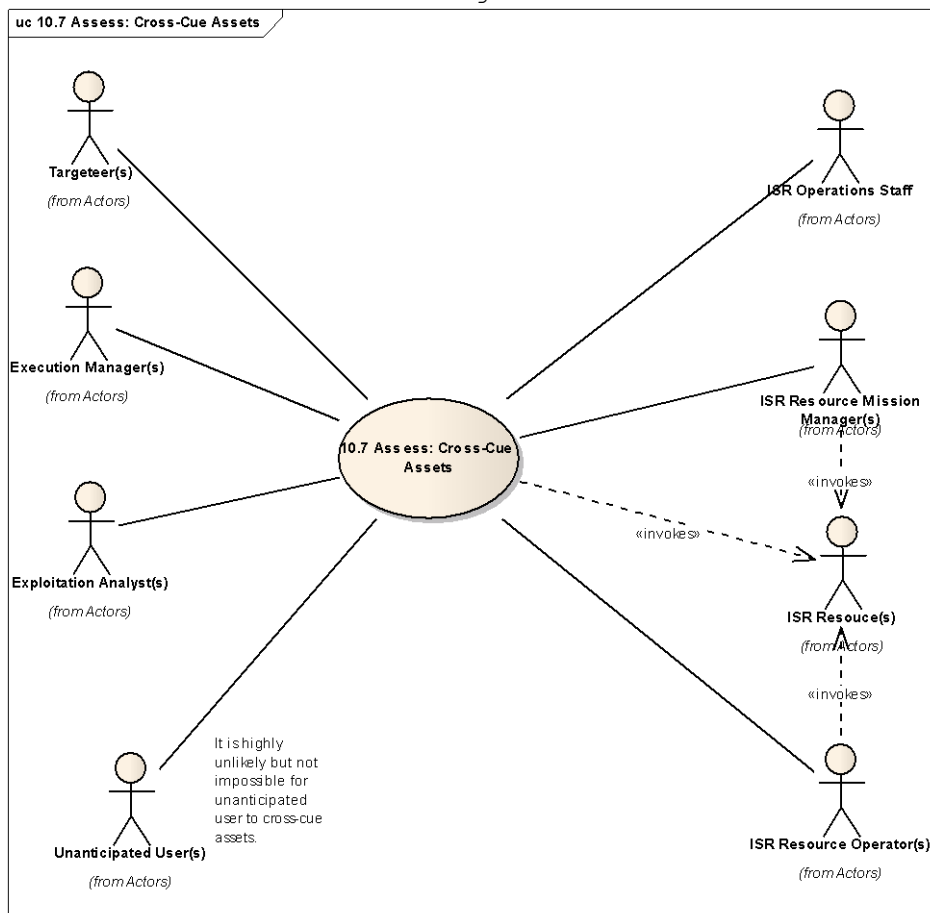


Figure 62: 10.7 Assess: Cross-Cue Assets

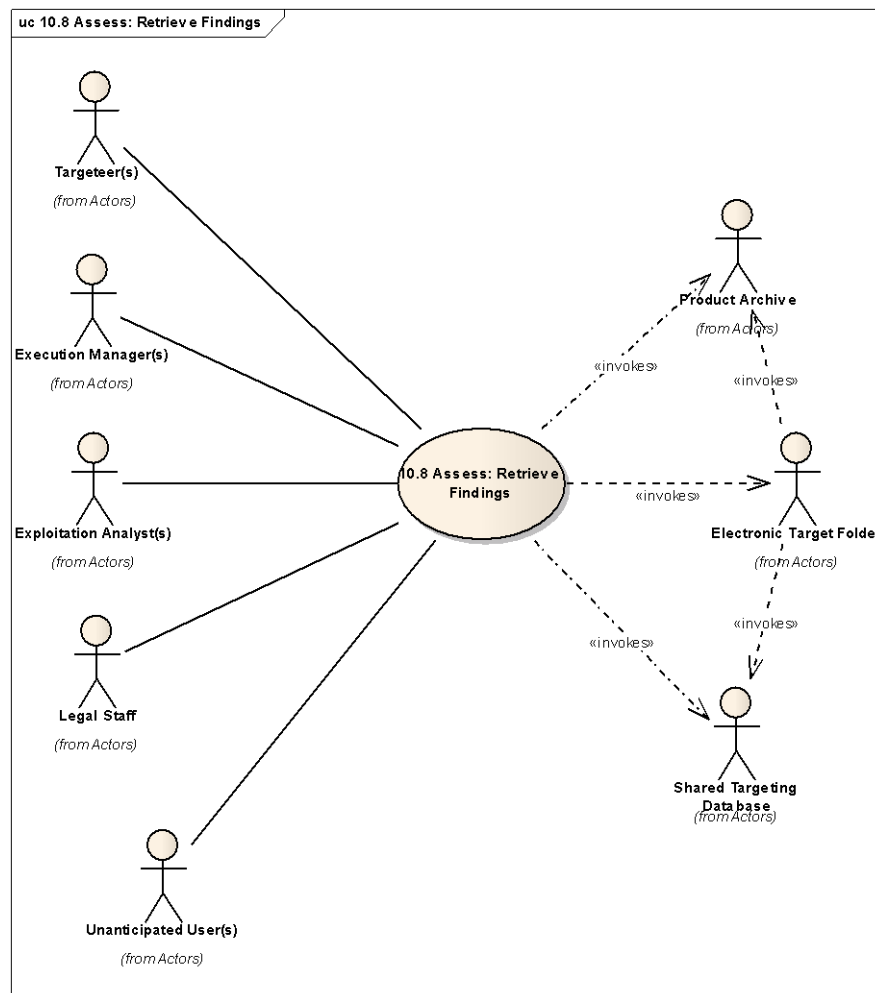


Figure 63: 10.8 Assess: Retrieve Findings

2.12.1 10.1 Assess: Determine ISR Resource Availabilities

Determines which ISR assets are available to support the assessment phase. This could be driven by spatial, temporal, or spectral capability constraints. Even though ISR is typically planned for this phase, it is still prudent to determine if anything else is now available. This might also support continually scanning the enterprise in case something might become available in the vicinity of expected damage/effects.

Flow of Events

Basic Path

Typical

1. TST planners consult collection manager to determine what ISR resources are available to support execution plan
2. CM determines this information
3. CM advises planners of ISR resource availabilities that suit the planning problem

Alternate

Automated

1. TST planners consult ISR resource availability service
2. TST planners select available resources that suit the execution plan

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports Joint Targeting

Pre-condition

Status: Approved

Theater ISR capabilities are known

Capabilities of the theater ISR collectors is known

Process

Status: Approved

Limitations

The search for asset availability may be constrained to a period of time, sensor tuning/discipline, spatial concern, ownership, reliability, or other constraints

Process

Status: Approved

Search also considers TPED assets if needed

Availability determination must include TPED elements if these are needed to support sensor use

2.12.2 10.2 Assess: Feed FMV

FMV is fed from live sources or from archive for the purpose of assessing whether target engagement was successful. This activity may occur in realtime or performed retrospectively. FMV might observe motion effects (smoke, flame, target reaction) or survey the extent of damage post strike.

Flow of Events

Basic Path

Typical

1. User connects to live feed
2. FMV feed streams to user

Alternate

Buffered feed

1. Comms, collector, or exploitation latency occurs
2. FMV product is temporarily buffered

Alternate

Archival feed

1. User desires to review FMV captured at an earlier time/date
2. Captured feed is located in archive
3. Captured feed is streamed to user from archive

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports Joint Targeting

Pre-condition

Status: Approved

Resource is available

Live or archival resource is available to feed FMV

Process

Status: Approved

Resource remains available

Resource remains available throughout the Assessment operation

2.12.3 10.3 Assess: Tune FMV Resource

Perform adjustments to the FMV asset tuning. This could be spatial (pointing, slewing, zooming), spectral, or some other control parameter adjustment. During the Assessment phase, tuning would likely be needed to fully capture effects on targets and possibly the aftermath. Similarly, the resource would likely report to assess the extent of damage and search for any unintended or collateral effects.

Flow of Events

Basic Path

Typical

1. Execution Manager or Analyst requests change in resource tuning parameters
2. Sensor operator, mission manager, or resource validates request
3. Sensor operator, mission manager, or resource performs request
4. Feedback is sent to requestor

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports Joint Targeting

Pre-condition

Status: Approved

Resource is tunable

Not all resources will offer tunable parameters

Process

Status: Approved

User has permission to tune resource

User must have permission to alter resource tuning

2.12.4 10.4 Assess: Analyze FMV

Analyze contents of live or recorded FMV feed. This could include contrast / brightness adjustment, feature extraction, replay, stop motion, slow motion etc. In the case of Assessment operations, the operator will be trying to determine

whether intended effects were successful. This might include observing detonation, fire, smoke, loss of mobility, sinking, or any number of effects of varying visibility. Targeteers will also likely analyze the local environment for indications of collateral damage.

Flow of Events

Basic Path

Typical

1. Analyst controls presentation of FMV product
2. Analyst records findings possibly into an electronic target folder

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports Joint Targeting

Process

Status: Approved

Exploitation support data are present

ESD may need to be present in the stream to effectively analyze the FMV feed.

2.12.5 10.5 Assess: Measure from FMV

Allow operator to measure some quantity from the FMV feed/replay. In the case of assessment this might include measuring the number and depth of craters, counting bodies, and determining the position of weapon entry holes.

Flow of Events

Basic Path

Typical

1. Analyst freezes feed
2. Analyst measures location or dimension
3. Analyst is given correct value for measurement
4. Targeteer or Execution Manager relays or records measurement

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports Joint Targeting

Process

Status: Approved

Presence of ESD in feed

This use case relies on some form of ESD metadata to be present in the feed so that accurate positional and dimensional information can be extracted from the product.

2.12.6 10.6 Assess: Store Findings

Place contents of feed or assessment sub-products into some form of archive for later review or retrieval. Target materials such as assessment graphics and exploited FMV might be placed in electronic target folders and structured target intelligence (e.g., a damage call) in a shared targeting database. As this feed will likely include the Assessment, it is essential that full quality provisions are made.

Flow of Events

Basic Path

Typical

1. Analyst indicates FMV segment and analytical products to be saved
2. Analyst initiates storage process
3. Materials are stored on media

Basic Path

Database update

Analyst updates target damage assessment or status in shared target database

Alternate

Automated

All FMV take and analytical operations are stored

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports Joint Targeting

Pre-condition

Status: Approved

Media availability

Media must be available to record or store findings

Pre-condition

Status: Approved

Target database access

If writing to Target database, need access to this item

Process

Status: Approved

Media capacity

Sufficient media must exist to store selected FMV feed

Process

Status: Approved

Target database permission

Will need permission to write to a shared Target database

2.12.7 10.7 Assess: Cross-Cue Assets

This is often needed to hand-off a target between collection resources during the transition from targeting to assessment operations so that the target is observed when and after effects are delivered to the target. This activity might cue an ISR

resource other than an FMV resource such as an spectral, MTI, or radar capability - particularly in low-light settings.

Flow of Events

Basic Path

Typical

1. Analyst / operator gains awareness of other cueable resources
2. Analyst / operator initiates coordination with operator of sensor to be cued
3. Sensor / mission manager / sensor operator of cued sensor indicates assent
4. Pointing vector is developed
5. Pointing vector is sent
6. Cued sensor slews to new vector
7. Cued resource indicates ready state
9. Feed is cut over to new resource
9. Analyst confirms new feed

Alternate

EC08 JMT

1. Invokes ISR Management
2. Supports NT-ISR
3. Supports Joint Targeting

Pre-condition

Status: Approved

Resources are available to cross cue

To cross cue, sufficient resources must be available

Process

Status: Approved

Operator awareness

Execution and ISR operations managers and analysts must be aware that other ISR and engagement system resources are available to support cross cueing

Process

Status: Approved

Permission to control

Operators must have permission to cue other resources

Process

Status: Approved

Availability of PED

Cued collection resources must have available PED resources

Process

Status: Approved

Means for effective hand-off

Some means to pass pointing vectors must exist

2.12.8 10.8 Assess: Retrieve Findings

Retrieve previous findings from the assessment possibly extending into earlier tracking and targeting operations. This use case serves many actors as the details of the engagement and conclusion made as to its outcome are needed by many execution and intelligence functions, it is reasonable to assume that many of the actors will be unanticipated.

If persistent surveillance had been available, the entire target lifecycle through the F2T2EA sequence might have been recorded for certain targets thus making the assessment process richer.

Flow of Events

Basic Path

Typical

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media segment
3. FMV segment is spooled for review

Basic Path

Database pull

1. Target information is pulled from database using some form of query such as target ID (e.g., BE Number), area of coverage etc.
2. Results are displayed

Alternate

Offline pull

1. Analyst indicates which segment to retrieve. This likely involves the specification of a particular resource and a certain timeframe
2. Storage resource locates media storage container as offline
3. Container is retrieved and loaded
4. FMV segment is spooled for review

Alternate

EC08 JMT

1. Supports NT-ISR
2. Supports Joint Targeting

Pre-condition

Status: Approved

Material must have been recorded

To be retrieved, FMV products must have been recorded at some point

Pre-condition

Status: Approved

Recording is locatable

Recorded media must have been tagged, labeled, indexed, or catalogued so that it can be discovered again. Recording resource must also be online and available.

Pre-condition

Status: Approved

Recorded material format

Recorded material must be in a format compatible with existing playback/analysis capabilities

Pre-condition

Status: Approved

Database is accessible

To retrieve targeting info placed in the targeting database, it must be accessible to consumers

Pre-condition

Status: Approved

Target Folders Accessible

To retrieve targeting info placed in the target folders, they must be accessible to consumers

2.13 11 Deliberate Combat Assessment Use Cases

This phase's use cases are similar to the Dynamic targeting Assessment use cases in that effects against targets are assessed. What typically differs is the scope of the assessment (physical, functional, and system assessment vs physical and functional), the number and types of sources used, and the stakeholders involved. Deliberate Combat Assessment ultimately assesses progress toward JFC command objectives as well as assessing operational effectiveness. These assessments can be used by the JFC to make strategic campaign decisions. If Dynamic Assessment Phase is done well, it contributes to this overall campaign assessment.

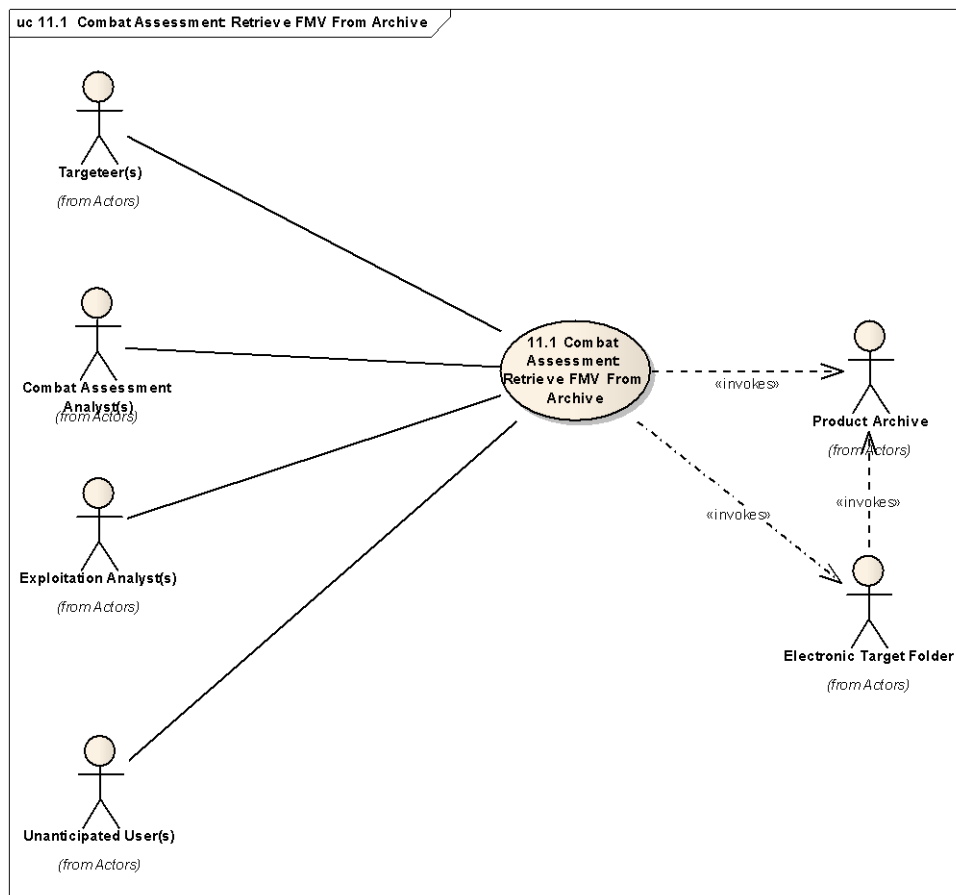


Figure 64: 11.1 Combat Assessment: Retrieve FMV From Archive

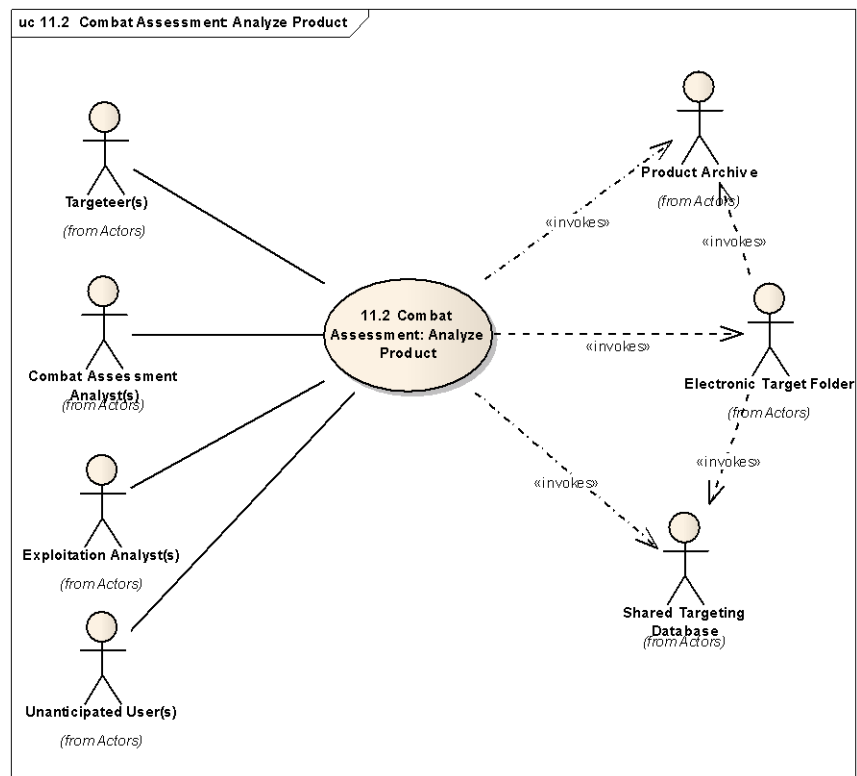


Figure 65: 11.2 Combat Assessment: Analyze Product

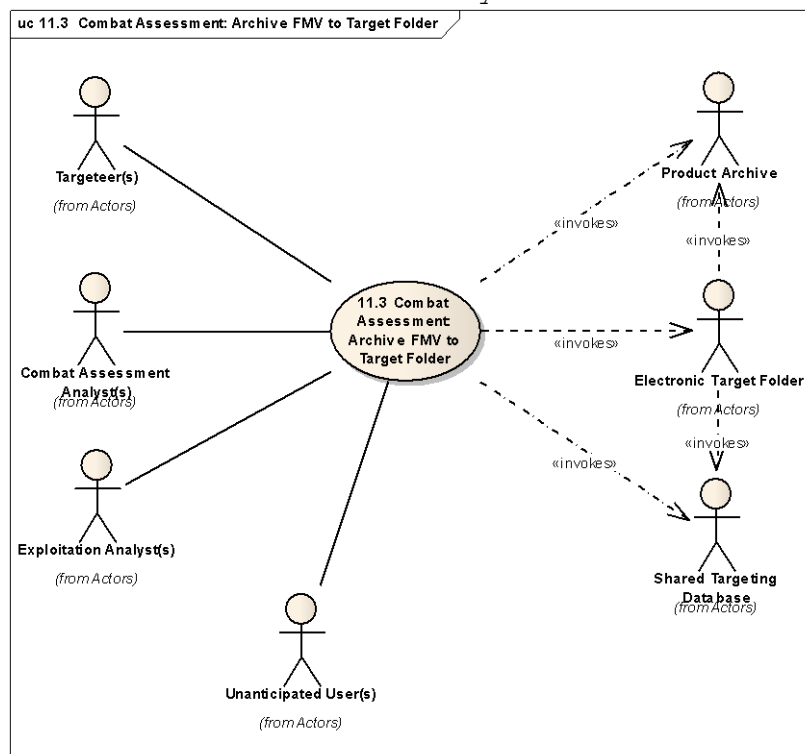


Figure 66: 11.3 Combat Assessment: Archive FMV to Target Folder

2.13.1 11.1 Combat Assessment: Retrieve FMV From Archive

Recover any FMV captured during combat operations that might contribute to the Combat Assessment task. This could be of fixed or mobile targets and might include weapons system video.

Flow of Events

Basic Path

Typical

1. Query target folder or archive catalog for FMV of target or target location
2. Pull FMV files at location

Alternate

EC08 JMT

1. Supports Joint Targeting

Pre-condition

Status: Approved

FMV exists in archive

Some amount of FMV exists for target being assessed.

Process

Status: Approved

FMV can be retrieved

If longhaul comms are involved or extensive security bridges, FMV products might not be practically retrievable

2.13.2 11.2 Combat Assessment: Analyze Product

Analyze FMV product for any evidence of targeted effects. This might range from simple observation of detonation to detailed analyses of the extent of damage or collateral damage.

Flow of Events

Basic Path

Typical

1. View FMV product
2. Make subproducts or frame shots

Alternate

EC08 JMT

1. Supports Joint Targeting

2.13.3 11.3 Combat Assessment: Archive FMV to Target Folder

Save segments or entire FMV product to target folder or annotated frames to product archive. Notations of observed effects are also placed in target folder which in turn may be update the shared targeting database.

Flow of Events

Basic Path

Typical

1. Select products and/or sub-products to save
2. Designate place to store
3. Store products there

Alternate

EC08 JMT

1. Supports Joint Targeting

Pre-condition

Status: Approved

Permissions

Permissions must permit updating the target folders, archive, and/or shared database.

2.14 12 Resource Architecture Change Use Cases

These use cases concern changes or perturbations to the FMV architecture.

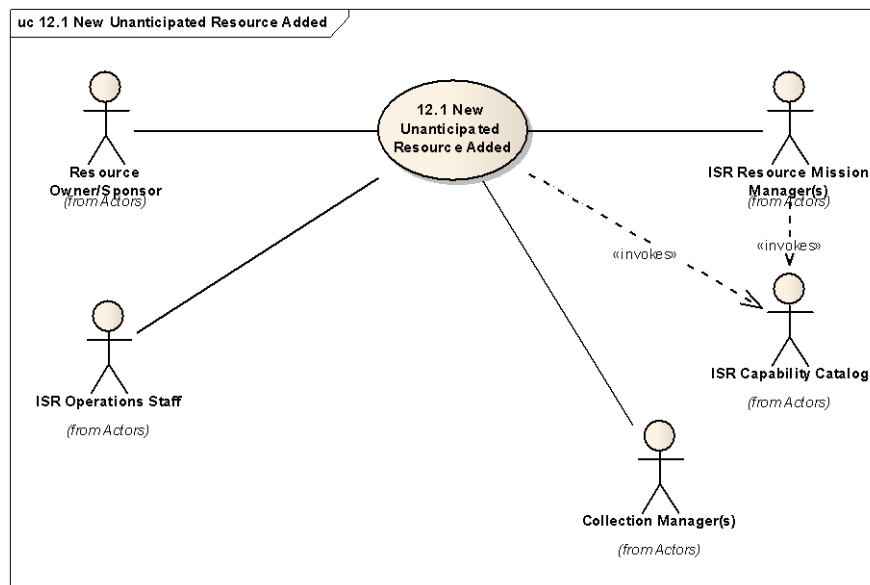


Figure 67: 12.1 New Unanticipated Resource Added

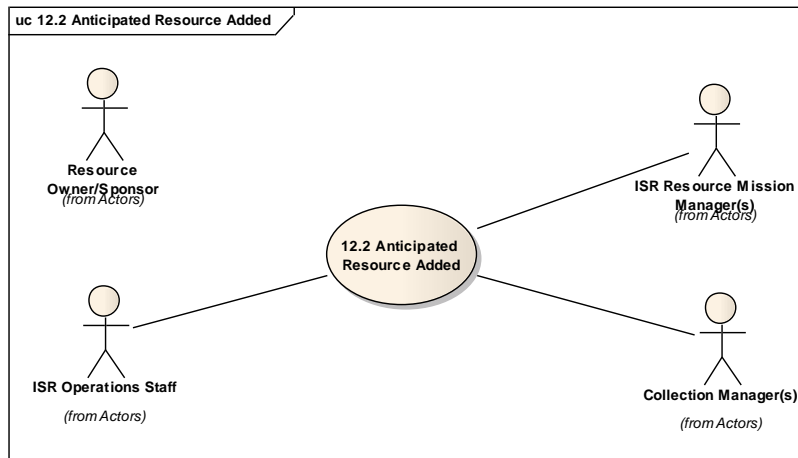


Figure 68: 12.2 Anticipated Resource Added

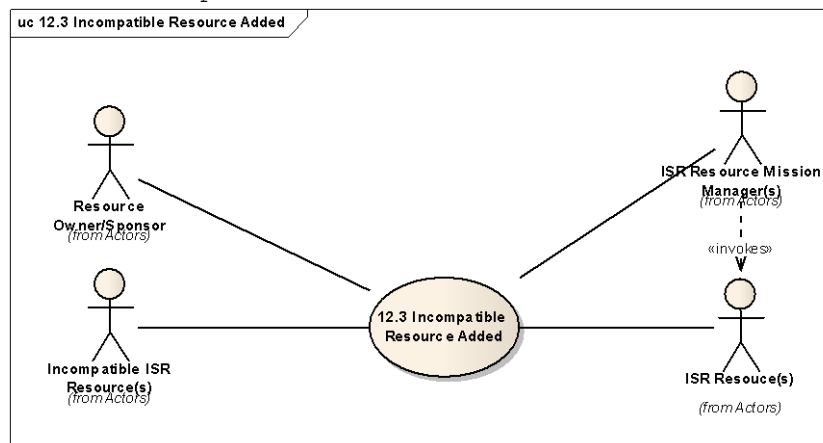


Figure 69: 12.3 Incompatible Resource Added

2.14.1 12.1 New Unanticipated Resource Added

A service entity or country's platform which has FMV capabilities is added to the ISR enterprise. This platform has not been used before. The new system is accommodated.

Flow of Events

Basic Path

Typical

**This is very speculative!

1. Resource "arrives" or becomes known
2. ISR Operations staff survey resource capabilities
3. Resource is adapted to enterprise ISR services
4. Enterprise capability catalogue is updated
5. Collection Management is made aware of new capabilities
6. New resource is placed online and used

Alternate

Offline

**This is very speculative!

1. Resource "arrives" or becomes known

2. ISR Operations staff survey resource capabilities
3. Resource is adapted to enterprise ISR services
4. New resource found to be not compatible with ISR services
5. Enterprise capability catalogue is updated
6. Collection Management is made aware of new capabilities
7. New resource remains offline but collected products are injected

Alternate

EC08 JMT

1. Invokes ISR Management

Pre-condition

Stable constellation in place

Status: Approved

Pre-condition

Resource can support constellation

General assumption is that the arriving resource has capabilities that are generally compatible with the greater enterprise.

Status: Approved

2.14.2 12.2 Anticipated Resource Added

A service entity or country's platform which has FMV capabilities is added to the ISR enterprise. This platform is regularly part of the enterprise. The new system is accommodated. This use case will probably be fairly common as some ISR resources will come and go and may not always be under the control of the TST Cell.

Flow of Events

Simple

Typical

****This is very speculative!**

1. Resource "arrives" or becomes known
2. ISR Operations staff update resource status to show availability
3. Collection Management is made aware of new availability
4. New resource is placed online and used

Alternate

EC08 JMT

1. Invokes ISR Management

Pre-condition

Resource capabilities known

This use case assumes that the capabilities of this resource are already known by the enterprise.

Status: Approved

2.14.3 12.3 Incompatible Resource Added

An ISR resource is added that is not compatible with some combination of enterprise tasking, product, capability inventory, or C2 interfaces and must be adapted to interoperate correctly.

Flow of Events

Basic Path

Typical

1. Resource Owner/Sponsor describes resource capabilities
2. Adaptors are written for key enterprise interfaces
3. Use case 11.1 or 11.2

Alternate

EC08 JMT

1. Invokes ISR Management

Pre-condition

Some connectivity possible

In order to add resource, some basic connectivity must be possible

Status: Approved

2.15 13 Architecture Variation Use Cases

These miscellaneous use cases deal with generic perturbations to the greater C4ISR enterprise.

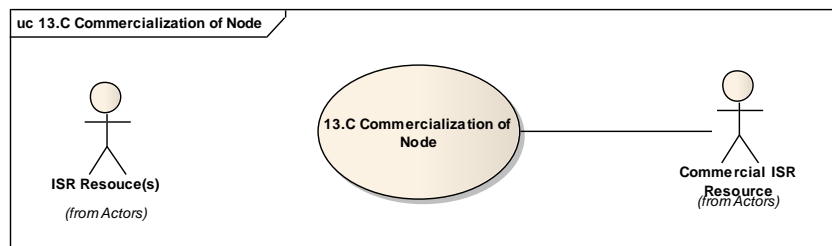


Figure 70: 13.C Commercialization of Node

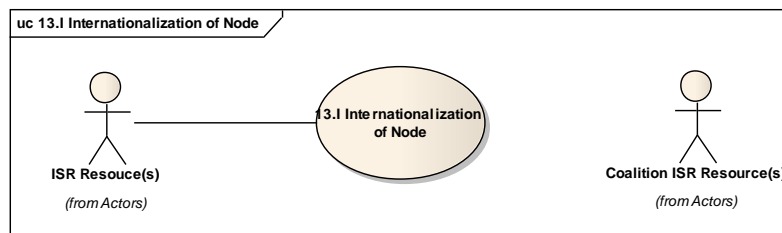


Figure 71: 13.I Internationalization of Node

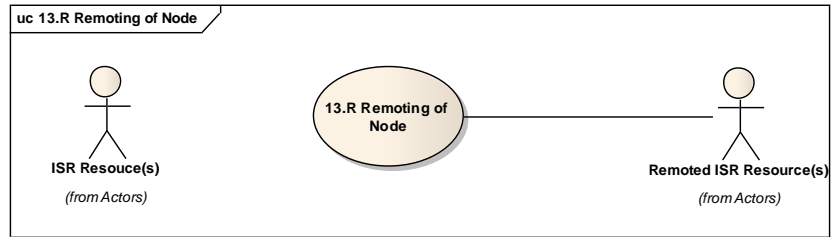


Figure 72: 13.R Remoting of Node

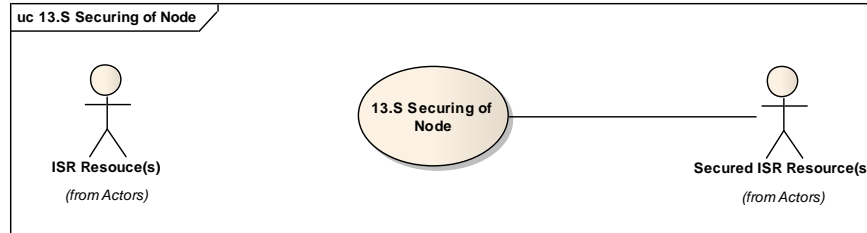


Figure 73: 13.S Securing of Node

2.15.1 13.C Commercialization of Node

This use case covers the generic implementation of an ISR functional node that is or is maintained by a commercial entity. For example, outsourcing collection to a commercial sensor or processing to a time and materials contract.

Flow of Events

Basic Path

Typical

** Highly speculative

1. Provider is acquired
2. Contractual provisions are set
3. Contract is awarded
4. Contractor equipment is certified
5. Appropriate security bridges/guards are implemented

Pre-condition

Status: Approved

Compatible systems

Commercial systems will have to be compatible with the enterprise

Pre-condition

Status: Approved

Contract in place

Commercial node providers will have to have a contract in place that stipulates terms of engagement

Pre-condition

Status: Approved

Releasability / Need to know

Access to other parts of the enterprise and its resources will be predicated on a need-to-know basis. Releasability must be accommodated.

Pre-condition

Status: Approved

Intellectual property controls

Contracts and agreements must stipulate IP conditions and procedures

2.15.2 13.I Internationalization of Node

A functional node or ISR resource is implemented in a coalition enclave different than the functional nodes that precede or follow it. For example, Australia establishes a TST Cell for targets in a particular area.

Flow of Events

Basic Path

Typical

*** Highly speculative

1. State issues are resolved
2. Rules of engagement, CONOPs, C2 roles and responsibilities are worked out
3. Node is accredited to run on destination LAN
4. Security bridges are put in place and tested
5. Node is placed online

Pre-condition

Status: Approved

Compatibility

Coalition systems must be compatible with the ISR Enterprise or be adapted to this end

Pre-condition

Status: Approved

Accreditation

Coalition node must be accredited to connect to ISR enterprise

Pre-condition

Status: Approved

Releasability

Products bound for this node must be correctly marked for releasability and pass through an appropriate guard technology

Pre-condition

Status: Approved

Need to know

Information passed to this node must be based on a validated need to know

2.15.3 13.R Remoting of Node

Some node of the ISR enterprise is physically separated from the others. This adds a long haul comms segment before and after the functional node and can challenge C2. This use case could represent forward delegation or reachback of parts of the enterprise.

Flow of Events

Basic Path

Forward deploy

1. Node is accredited to connect to distant LAN/WAN
2. Node is connected to LAN/WAN

Basic Path

Reachback

1. Node is accredited to connect to reachback LAN/WAN
2. Node is connected to LAN/WAN

2.15.4 13.S Securing of Node

An ISR resource is placed within a security enclave different than the ones before and/or after it in functional sequence. This places up and/or down security level changes between nodes.

Flow of Events

Basic Path

Typical

1. Enclave is established
2. ISR node is formed on enclave
3. Ensemble is accredited
4. Ensemble is connected to appropriate secure LANs
5. Security bridge/guards are developed for expected traffic structure
6. Security bridge/guards are accredited
7. Security bridges are implemented for replicated and transferred products

Pre-condition

Status: Approved

Security bridges permit this

Security bridges and guards must be in place and certified for nodes at different security levels to communicate.

Pre-condition

Status: Approved

Exchanged data has been correctly marked for release and dissemination