


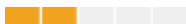
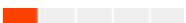



## Score Summary

Score	# of Reqs.	Percentage	What should I do?
5 	71	80%	Looking good, move along!
4 	0	0%	Review It! Check the flow and clarity of the requirement.
3 	17	19%	Revise It! Replace negative or ambiguous terms with clear and concise ones.
2 	0	0%	Rewrite It! Focus on what needs to happen and choose clear and unambiguous terminology to re-express the requirement.
1 	0	0%	Rethink It! Consider what the requirement is trying to convey and rewrite it as one concise requirement, or as separate multiple requirements.

## Analysis Breakdown


	Percentage	# of Reqs.	Color Highlighting
Vague Words	15%	14	Light Brown
Negative Imperatives	2%	2	Light Red
Optional Words	1%	1	Yellow
Multiple Imperatives	0%	0	Light Blue
No Imperatives	0%	0	No Highlight
Excessive Continuances	0%	0	Light Green
No Directives	N/A	N/A	No Highlight


## Individual Requirements


Score: 5  A reusable framework is needed that must support a broad class of autonomous ISR missions using unmanned assets — including unmanned aircraft.

Score: 5  The framework must enable distributed, multi-agent cooperative control in a comms-denied environment.

Score: 5  The framework must be modular

Score: 3  The framework must be computationally efficient  
Vague Words

Score: 5  The framework must run on modest hardware

Score: 5  The framework must allow for mission planning tasks

Score: 5



The framework must allow for path planning tasks

Score: 5



The framework must allow for mission planning tasks

Score: 3



Vague Words

The framework must allow for tasks to be efficiently developed, rapidly updated, and rapidly replaced before the start of ISR missions.

Score: 5



The framework must optimize tasks for mission-time efficiency.

Score: 5



The framework must ensure safety and security.

Score: 5



The framework must facilitate formal verification and validation.

Score: 5



UxAS shall enable cooperative control.

Score: 5



UxAS shall support multiple agents.

Score: 5



UxAS shall be distributed.

Score: 5



Universal Quantifiers

UxAS shall operate when there is no comms.

Score: 5



UxAS shall operate in the presence of lost comms

Score: 5



UxAS shall operate in the presence of denied comms

Score: 5



UxAS shall be modular

Score: 3



Vague Words

UxAS shall be computationally efficient: to run quickly on cell-phone sized processors

Score: 5



UxAS will run on modest hardware, e.g., cell-phone sized processor

Score: 3



Vague Words

UxAS shall allow tasks to be efficiently developed

Score: 5



UxAS shall allow configurations to be rapidly modified before the start of a mission

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Score: 5



Configurations shall optimize tasks for mission-time efficiency

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Score: 5



Configurations shall ensure the safety of agents by having collision avoidance.

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Score: 5



Configurations shall ensure the safety of agents by having health monitoring.

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Score: 5



Configurations shall ensure the safety of agents by having contingency planning

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Score: 5



Configurations shall ensure security integrity & confidentiality of comms

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Score: 5



Configurations shall ensure security integrity & confidentiality of onboard data

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Score: 5



Configurations shall ensure security availability of computing resources

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Score: 5



UxAS shall facilitate formal verification and validation

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Score: 5



UxAS shall be employ a service-oriented architecture

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Score: 5



Configurations shall be based off of a service oriented architecture

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Score: 5



Configurations shall ensure schedulability of tasks

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Score: 5



Configurations shall ensure timeliness of task execution

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Score: 5



Configurations shall ensure timeliness of message delivery within an asset

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Score: 5



Configurations shall guarantee non-interference amongst services under nominal hardware configurations

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Score: 5



Configurations shall provide time partitioning of services

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Score: 5



Configurations shall provide space partitioning of services

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Score: 5



Configurations shall provide resource partitioning of services

Score: 5



Configurations shall provide a message-passing interface for inter-service communication

Score: 3



Vague Words

There shall be a common interface for all services within a configuration.

Score: 3



Vague Words

For every Unique Automation Request, the system shall produce a response (which might be an error message).

Score: 3



Vague Words

Every task included in a request message shall be included in the associated response message.

Score: 5



If the request and response messages do not have identical task listings, an error shall be produced.

Score: 5



The system shall respect airspace constraints

Score: 3



Negative Imperatives

Paths produced shall not intersect with a "Keep-Out" zone.

Score: 5



Vehicles shall stay in "Keep-In" zones

Score: 5



If there is a feasible assignment (mission solution) possible the system shall calculate the solution.

Score: 5



If the process algebra relationship is valid (well-formatted), then we shall adhere to the defined relationship.

Score: 5



If the process algebra relationship is not valid (not well-formatted), then an error shall be generated

Score: 5



Vehicles altitudes shall be distinct and differ by at least X ft

Score: 3



Negative Imperatives

Vehicle altitudes shall not be changed during the mission

Score: 5



The costs associated with that of tasks and missions shall be influenced by vehicle altitude

Score: 5



If a map update is sent by the user, that user will also determine when to force a replan (for the entire system).

Score: 5



Assignment cost matrix coming out of route aggregator service shall be defined by the  $\#vehicles * \# task options + \# vehicles * (\#task options)^2$ .

Score: 5



Message IDs shall be unique system-wide throughout a mission

Score: 5



Route planner shall be configured with vehicle configuration data before a route plan request is sent (or received)?

Score: 5



Messages shall be received in the order in which they were sent

Score: 5



The system shall propagate error messages to the final recipient

Score: 5



A sent request message shall have a corresponding response or error message.

Score: 5



The configuration shall report an error if an automation request is received but the requested resource has not been defined

Score: 5



The configuration shall generate a UniqueAutomationRequest message if an AutomationRequest is received and the requested resource has been defined

Score: 5



The configuration shall publish UniqueAutomationRequest messages in the order in which they are generated

Score: 5



The configuration shall publish one UniqueAutomationRequest message and wait for a corresponding UniqueAutomationResponse message to be received

Score: 3



Vague Words

Universal Quantifiers

The configuration shall publish the next UniqueAutomationRequest message immediately if there is no outstanding UniqueAutomationResponse message

Score: 3



Optional Words

Optionally, the configuration shall publish the next UniqueAutomationRequest if the outstanding UniqueAutomationResponse message has not been received within a set time

Score: 5



The configuration shall publish an AutomationResponse message in response to the corresponding AutomationRequest message when a corresponding UniqueAutomationResponse message is received

Score: 5



The configuration shall ensure that only one AutomationRequest is executed at a time

Score: 5



Universal Quantifiers

The configuration shall create a unique RoutePlanRequest message for each vehicle ID in each RouteRequest message received

Score: 3



Vague Words

Universal Quantifiers

The configuration shall send each RoutePlanRequest message to the planners that are appropriate for the associated vehicle type

Score: 5



The configuration shall correlate RoutePlanReponses with RoutePlanRequests

Score: 3



Vague Words

The configuration shall send a RouteResponse message when all RoutePlanResponses are received for a particular RouteRequest

Score: 5



Universal Quantifiers

The configuration shall generate a route for each pair of start and end locations specified in each RoutePlanRequest message received

Score: 3



Vague Words

Route generation shall be efficient

Score: 5



Route generation shall be responsive

Score: 5



Routes shall be approximately distance optional

Score: 5



Routes shall respect vehicle limitations

Score: 3



Vague Words

The configuration shall send a RoutePlanResponse message using return-to-sender addressing when a route has been generated for all pairs of start and end locations specified in the associated RoutePlanRequest message

Score: 3



Vague Words

The configuration shall take environment and vehicle constraint information from appropriate inputs

Score: 5



UxAS shall ensure communication is only between intended services.

Score: 3



Vague Words

UxAS shall ensure data is only accessible to services with proper permission authority.

Score: 5



Universal Quantifiers

UxAS communication channels shall be always available to intended users.

Score: 5



UxAS will filter out garbage data from communication channels.

Score: 5



UxAS shall detect the authenticity of incoming messages.

Score: 5



UxAS will detect if an attacker resends an old message.

Score: 5



UxAS will encrypt communications.

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Score: 5



UxAS shall verify received messages are from a source authorized to send the given message type.

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