2018-03-01 DMP.Rev.F Master Variable List–DRAFT-CON

The present document (2018-03-01_MasterVariableList-DMP.Rev.F-Draft-CON .pdf) is an addendum to the Master Variable List entitled "2018-02-27_MasterVariableList-DMP.Rev.F-Draft.pdf". It contains the description of an additional TCL3 test area: CON-Concept of Operations/Human Factors. This document does not supersede "2018-02-27_MasterVariableList-DMP.Rev.F-Draft.pdf", but complements it.

This is a comprehensive list of CON-related deliverables that will be requested and collected by NASA from the Test Site Operators as part of TCL3. A complete and expanded list of deliverables for TCL3 will be released as a single document, "Flight Data Management Plan (DMP) Rev.F", to be published at a later date. DMP Rev.F will contain detailed explanations, definitions, formatting of the data and instructions for submission. This list is subject to be modified and expanded as the development of the DMP Rev.F and associated software progresses.

Subsequent versions of this Variable Master List might be provided to the Test Site Points of Contact (POCs) as early as practical with the goal of maintaining the POCs informed of updates to Rev.F and of helping with the design of experiments and data collection.

TCL3 will focus in the following Test Areas:

1- CNS (): Communication, Navigation and Surveillance
2- SAA (): Sense and Avoid
3- DAT (): Data and Information Exchange
4- CON (): Concept of Operations

The present draft includes the following Test Areas: CON

(e) CON (): Concept of Operations
CON.1: BVLOS Landing
CON.2: Contingency Initiation
CON.3: Public Portal
CON.4: Multiple TCL-2/3 operations for a sustained period
CON.5: FIMS/USS interaction when vehicle heads towards controlled or unauthorized airspace
Human Factors

Each table presents the variables REQUIRED by a specific Test Area (identified by test number). CON requires also submitting additional PDF and KML files, as explained in this document. There will be information related to Human Factors collected through online surveys, questionnaires & debriefings. The link(s) will be sent by NASA's Human Factors POC. Providing this Human Factors data is mandatory for ALL tests.

Test Site Operators / USSs must collect the data pertinent to their specific tests in preparation for future delivery to NASA. Operators are welcome to submit more data than the minimum required, but if an operator is doing a specific test(s) for TCL3, the operator MUST submit the variables listed as part of such test.

4-CON (): Concept of Operations

CON.1-BVLOS Landing

Variable Name	Type	Description	Time Dependent (TD) / Independent (TI)	Required by
plannedBvlosLandingPoint_deg	STRING	Specify list of planned BVLOS landing point(s) in the following format: ”[Lat_1,Lon_1],[Lat_2,Lon_2],....[Lat_n,Lon_n]" (include quotation marks). e.g. for 3 different BVLOS landing points, a valid value of plannedBvlosLandingPoint_deg could be "[37.4119851,-122.0623431],[37.4119853,-122.0623429],[37.4119857,-122.0623423]" Report at least seven decimal degrees. (deg)	TI	CON.1
plannedBvlosLandingPointAlt_ft	STRING	Specify list of planned BVLOS landing point altitude(s) in the following format: ”[LandAlt_1],[LandAlt_2],....[LandAlt_n]" (include quotation marks). e.g. for 3 different BVLOS landing altitudes a valid value of plannedBvlosLandingPointAlt_ft could be "[300],[250],[350]" Expressed in WGS84 standard (ft)	TI	CON.1
actualBvlosLandingPoint_deg	STRING	Specify list of actual BVLOS landing point(s) in the following format: ”[Lat_1,Lon_1],[Lat_2,Lon_2],....[Lat_n,Lon_n]" (include quotation marks). e.g. At a given moment, for 3 different BVLOS landing points, a valid value of actualBvlosLandingPoint_deg could be "[37.4119851,-122.0623431],[37.4119853,-122.0623429],[37.4119857,-122.0623423]" This is a time dependent variable (UTC time stamped), specify “actualBvlosLandingPoint_deg” as many times as the BVLOS landing point settings change during the flight (e.g. for a fixed point, it’ll have the same values of [Lat_n, Lon_n] all along the flight). Report at least seven decimal degrees. (deg)	TD	CON.1
actualBVLOSLandingPointAlt_ft	STRING	Specify list of actual BVLOS landing point(s) altitude(s) in the following format: ”[LandAlt_1],[LandAlt_2],....[LandAlt_n]" (include quotation marks). e.g. for 3 different BVLOS landing altitudes a valid value of actualBVLOSLandingPointAlt_ft could be "[300],[250],[350]". (UTC time stamped). This is a time dependent variable, specify “actualBVLOSLandingPoint_alt” as many times as the actual BVLOS landing point(s) altitude change during the flight. (e.g. it’ll have the same values of LandAlt_n, for a fixed point).	TD	CON.1

		Expressed in WGS84 standard (ft)		
landingOffset_ft	STRING	This is the lateral distance between planned landing point and actual landing point. Specify list of landing offset(s) in the following format: ”[LandingOffset_1],[LandingOffset_2],....[LandingOffset_n]" (include quotation marks). e.g. for 3 different landing points, a valid value of landingOffset_ft could be "[23],[0],[7]" (ft)	TI	CON.1
alongTrackDistanceFlown_ft	FLOAT	Total distance traveled between all waypoints during a flight (ft)	TI	CON.1
distanceFromLaunchSite_ft	FLOAT	Farthest lateral distance that UAS traveled from takeoff point during a flight (ft)	TI	CON.1
operationPlanInfo	Refer to SwaggerHub link	UAS operator and the USS must ensure that ALL the mandatory variables (identified with a red asterisk) specified in the OperationVolume section of the corresponding swaggerHub page are submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/OperationVolume	Refer to SwaggerHub link	CON.1, CON.2, CON.4, CON.5 (report once if doing 2 or more tests concurrently)
bvlosLandingZoneSize_ft	STRING	Specify list of all landing zone radius(es) in the following format: ”[LZradius_1],[LZradius_2],....[LZradius_n]" (include quotation marks) e.g. for 3 different landing zone radiuses a valid value of bvlosLandingZoneSize_ft could be "[12],[15],[10]" (ft)	TI	CON.1
bvlosLandingZoneStructure_deg	STRING	If structures are present in the BVLOS landing zone, specify the area as a polygon with vertices expressed in the following format: ”[Lat_1,Lon_1],[Lat_2,Lon_2],....[Lat_n,Lon_n]" (Include quotation marks). e.g. for a structure enclosed in a polygon with 4 vertices, a valid value of bvlosLandingZoneStructure_deg could be "[37.414416,-122.055406],[37.414835,-122.054245],[37.411660,-122.052566],[37.411408,-122.053889]" Report at least seven decimal degrees. (deg)	TI	CON.1
bvlosLandingZonePeople_deg	STRING	If people are present in the BVLOS landing zone specify the area as a polygon of with vertices expressed in the following format: ”[Lat_1,Lon_1],[Lat_2,Lon_2],....[Lat_n,Lon_n]" (Include quotation marks). e.g. for a zone with people enclosed in a polygon with 4 vertices, a valid value of bvlosLandingZonePeople_deg could be "[37.414416,-122.055406],[37.414835,-122.054245],[37.411660,-122.052566],[37.411408,-122.053889]"	TI	CON.1

		Report at least seven decimal degrees. (deg)		
wxBvlosLandingZone1Data	STRING	Provide weather information at the BVLOS landing zone #1 in the following format and order: "[Temperature,Pressure,WindSpeed,WindDirection]" (include quotation marks), with the following units: Temperature (in Fahrenheit) Pressure (in inHg) WindSpeed (in ft/s) WindDirection (in deg, true North reference frame) e.g. At a given moment, a valid value of wxBvlosLandingZone1Data could be "[95,29.6,2,315]" This is a time dependent variable (UTC time stamped), specify “wxBvlosLandingZone1Data” as many times as the weather report is updated during the flight	TD	CON.1
wxBvlosLandingZone2Data	STRING	Provide weather information at the BVLOS landing zone #2 in the following format and order: "[Temperature,Pressure,WindSpeed,WindDirection]" (include quotation marks), with the following units: Temperature (in Fahrenheit) Pressure (in inHg) WindSpeed (in ft/s) WindDirection (in deg, true North reference frame) e.g. At a given moment, a valid value of wxBvlosLandingZone1Data could be "[95,29.6,2,315]" This is a time dependent variable (UTC time stamped), specify “wxBvlosLandingZone1Data” as many times as the weather report is updated during the flight	TD	CON.1
wxBvlosLandingZone3Data	STRING	Provide weather information at the BVLOS landing zone #3 in the following format and order: "[Temperature,Pressure,WindSpeed,WindDirection]" (include quotation marks), with the following units: Temperature (in Fahrenheit) Pressure (in inHg) WindSpeed (in ft/s) WindDirection (in deg, true North reference frame) e.g. At a given moment, a valid value of wxBvlosLandingZone1Data could be "[95,29.6,2,315]"	TD	CON.1

		This is a time dependent variable (UTC time stamped), specify "wxBvlosLandingZone1Data" as many times as the weather report is updated during the flight		
interfaceAndProceduresData	Observation, questionnaires, & debrief	This information will be captured through Human Factors Surveys, to be provided to POCs by NASA before the flight tests take place (completing those surveys is mandatory). Topics to be covered: What considerations, if any, were taken into account in planning the flight profile and volumes for this operation particularly for the landing/return phase? What was the strategy? Were additional considerations discovered that are necessary for planning and conducting a BVLOS landing flight? What was the procedure for the BVLOS landing and return phase?	TI	CON.1
Communication Systems Description This is a section of a single CON PDF file	PDF	Section name: CON.1-Communications Systems Description (same content as CNS.1-Communications Systems Description) Description of the type of communication systems the UAS is using for C2. Vehicle used in this test must have more than one communication system, featuring redundant C2 link. For point-to-point radio system, must include system specification document from manufacturer of the communication system or the vehicle maker as a part of this description. For mesh-network based system, must include description of mesh-network setup and coverage area, and also expected performance of the mesh-network, such as expected data transfer rate, expected latency, etc. For cellular network based system (e.g., LTE), must include description of the network including provider, cell tower locations, frequencies used, expected data transfer rate, expected latency, etc. For satellite based system (e.g., iridium), must include description of satellite service, including provider, coverage area, expected data transfer rate, expected latency, etc.	TI	CON.1
Process To Switch Between Redundant C2 Link This is a section of a single CON PDF file	PDF	Section name: CON.1-Process To Switch Between Redundant C2 Link (same content as CNS.1-Process To Switch Between Redundant C2 Link) Description of process to switch from one C2 link to another. Must indicate whether switching is automatically or manually performed, and describe steps involved including actions to be taken by person(s) in the manual	TI	CON.1

		case. Flowchart, sequence diagram, or other visualization methods can be used to describe this process. Note: To be collected only if test site is using multiple C2 links during the course of a flight (RedundantC2 available)		
c2RssiAircraft_dBm	FLOAT	C2 link RSSI measured in dBm at aircraft (dBm)	TD	CON.1
c2RssiGcs_dBm	FLOAT	C2 link RSSI measured in dBm at GCS (dBm)	TD	CON.1
c2NoiseAircraft_dBm	FLOAT	Sum of Thermal noise power and RF interference power, measured in dBm at aircraft (dBm)	TD	CON.1
c2NoiseGcs_dBm	FLOAT	Sum of Thermal noise power and RF interference power, measured in dBm at GCS (dBm)	TD	CON.1
c2PacketLossRateAircraftPrct_nonDim	FLOAT	Packet loss rate at aircraft (0 to 100% of packets lost)	TD	CON.1
c2PacketLossRateGcsPrct_nonDim	FLOAT	Packet loss rate at GCS (0 to 100% of packets lost)	TD	CON.1
UTM TCL3 CON PDF Template	PDF	UTM TCL3 CON PDF Template - guidelines A template will be provided by NASA for the elaboration of this report. It is important to follow the file naming format as our software will sort files based on the name. File name format: UTM-{yourOrganizationName}-CON-{0} or{1,2…n}.pdf Example: - If all the CON flight (i.e. GUFI) PDF files have the same content then the file name will be: UTM-UASORG-CON-0.pdf - If a few CON flight (i.e. GUFI) PDF files have the same content then each version of the file name will be UTM-UASORG-CON-1.pdf, UTM-UASORG-CON-2.pdf, UTM-UASORG-CON-3.pdf …. n.pdf - If all the CON flight (i.e. GUFI) PDF files have different content then each file name will be UTM-UASORG-CON-1.pdf, UTM-UASORG-CON-2.pdf, UTM-UASORG-CON-3.pdf …. n.pdf	TI	CON.1, CON.2, CON.4 (one single "CON" PDF file for the three tests, or for whichever CON tests are performed)

CON.2-Contingency Initiation

Variable Name	Type	Description	Time Dependent (TD) / Independent (TI)	Required by
operationPlanInfo	Refer to SwaggerHub link	UAS operator and the USS must ensure that ALL the mandatory variables (identified with a red asterisk) specified in the OperationVolume section of the corresponding swaggerHub page are submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/OperationVolume	Refer to SwaggerHub link	CON.1, CON.2, CON.4, CON.5 (report once if doing 2 or more tests concurrently)
declaredEmergency	STRING	Description of the Emergency event. Message should consist of 280 characters max, between quote marks " ", all characters in between are valid except for quote marks as they signal the beginning and end of the string. This is a time dependent variable (UTC time stamped), specify a "declaredEmergency" message as many times as it happens during the flight.	TD	CON.2
emergencyInitiationTime	FLOAT	UTC time when emergency is initiated by the operator. Use ISO 8601 format conforming to pattern: YYYY-MM-DDThh:mm:ss.sssZ. Seconds must have up to millisecond accuracy (three positions after decimal). The 'Z' implies UTC time and is the only timezone accepted.	TD	CON.2
emergencyCompletionTime	FLOAT	UTC time when emergency is reported completed by the operator. Use ISO 8601 format conforming to pattern: YYYY-MM-DDThh:mm:ss.sssZ. Seconds must have up to millisecond accuracy (three positions after decimal). The 'Z' implies UTC time and is the only timezone accepted.)	TD	CON.2
contingencyCause_nonDim	STRING	Defined as a cause that necessitates a contingency response. Specify list of contingency causes in the following format: "[0],[1],....[n]" (include quotation marks); e.g. At a given moment, for simultaneous contingencies LOST_NAV, LOW_FUEL and SECURITY (3, 5 and 10, as defined below), the value of contingencyCause_nonDim would be: "[3],[5],[10]". For no contingency, the value of contingencyCause_nonDim would be: "[0]" This is a time dependent variable, specify "contingencyCause_nonDim " as many times as the contingency(ies) occur simultaneously or separately during the flight. Specify an integer value for either cause: 0. NO_CONTINGENCY_CAUSE	TD	CON.2

		1. LOST_C2_UPLINK The operation has lost command or control uplink to the vehicle. 2. LOST_C2_DOWNLINK The operation has lost downlinks from the vehicle. 3. LOST_NAV The vehicle no longer has sufficient navigation sources. 4. LOST_SAA The vehicle's sense and avoid solution is no longer reliable. 5. LOW_FUEL The vehicle does not have enough power to complete its mission. Still enough fuel to safely land or potentially return to base. 6. NO_FUEL The vehicle is either completely without fuel or has only enough fuel to land immediately. 7. MECHANICAL_PROBLEM The vehicle is experiencing a mechanical problem necessitating initiation of a contingency response. 8. SOFTWARE_PROBLEM The vehicle or some component of the required platform ground equipment is experiencing a software problem. 9. ENVIRONMENTAL There are conditions in the environment necessitating initiation of a contingency response. Generally these will be weather-related phenomena. 10. SECURITY There is a security incident interrupting this operation. 11. TRAFFIC The density or type of air traffic near the vehicle necessitated a contingency response. 12. LOST_USS The operation has lost at least some portion of expected USS services. 13. OTHER Some cause not captured in any other category.		
contingencyResponse_nonDim	INTEGER	Specify an integer value for either contingency response (only one state valid at any given time) This is a time dependent variable, specify "contingencyResponse_nonDim" as many times as a contingency response occur simultaneously or separately during the flight. Specify an integer value for either response: 0. NO_CONTINGENCY_RESPONSE 1. LANDING The operation will be landing by targeting the contingency_point. 2. LOITERING The operation will loiter at the contingency_point at the specified altitude with the noted loiter_radius_ft. 3. RETURN_TO_BASE	TD	CON.2

		The operation will return to base as specified by the contingency_point. The USS may issue an update to the operation plan to support this maneuver.		
plannedContingencyLandingPoint_deg	STRING	Specify list of predetermined contingency landing point(s) in the following format: ”[Lat_1,Lon_1],[Lat_2,Lon_2],....[Lat_n,Lon_n]" (include quotation marks). e.g. for 3 different landing points, a valid value of plannedContingencyLandingPoint_deg could be "[37.4119851,-122.0623431],[37.4119853,-122.0623429],[37.4119857,-122.0623423]" Report at least seven decimal degrees. (deg)	TI	CON.2
plannedContingencyLandingPointAlt_ft	STRING	Specify list of predetermined contingency landing point altitude(s) in the following format: ”[LandAlt_1],[LandAlt_2],....[LandAlt_n]" (include quotation marks). e.g. for 3 different landing altitudes a valid value of plannedContingencyLandingPointAlt_ft could be "[300],[250],[350]" Expressed in WGS84 standard (ft)	TI	CON.2
contingencyLandingPoint_deg	STRING	Specify list of actual contingency landing point(s) in the following format: ”[Lat_1,Lon_1],[Lat_2,Lon_2],....[Lat_n,Lon_n]" (Include quotation marks). e.g. At a given moment, for 3 different landing points, a valid value of contingencyLandingPoint_deg could be "[37.4119851,-122.0623431],[37.4119853,-122.0623429],[37.4119857,-122.0623423]" This is a time dependent variable (UTC time stamped), specify “contingencyLandingPoint_deg” as many times as the contingency landing point settings change during the flight (e.g. for a fixed point, it’ll have the same values of [Lat_n, Lon_n] all along the flight). Report at least seven decimal degrees. (deg)	TD	CON.2
contingencyLandingPointAlt_ft	STRING	Specify list of actual contingency landing point altitude(s) in the following format: ”[LandAlt_1],[LandAlt_2],....[LandAlt_n]" (include quotation marks). e.g. for 3 different landing altitudes a valid value of contingencyLandingPointAlt_ft could be "[300],[250],[350]". (UTC time stamped). This is a time dependent variable (UTC time stamped), specify “contingencyLandingPointAlt_ft” as many times as the contingency landing point settings change during the flight (e.g. for a fixed point, it’ll have the same values of [LandAlt_n] all along the flight). Expressed in WGS84 standard (ft)	TD	CON.2
plannedContingencyLoiterAlt_ft	STRING	Specify list of predetermined contingency loiter altitude(s) in the following format: ”[LoiterAlt_1],[LoiterAlt_2],....[LoiterAlt_n]" (include quotation marks).	TI	CON.2

		e.g. for 3 different loiter altitudes a valid value of plannedContingencyLoiterAlt_ft could be "[300],[250],[350]" Expressed in WGS84 standard (ft)		
plannedContingencyLoiterRadius_ft	STRING	Specify list of contingency loiter radius(es) in the following format: ”[LoiterRadius_1],[LoiterRadius_2],....[LoiterRadius_n]" (include quotation marks). e.g. for 3 different loiter radiuses a valid value of plannedContingencyLoiterRadius_ft could be "[100],[30],[55]"	TI	CON.2
contingencyLoiterType_nonDim	INTEGER	Specify an integer value for either loiter type (UTC time stamped): 0=No contingency 1=Hover at location 2=Loiter around the point in a circular flight pattern 3=Any other type (must include description of such in "CNS1-Loss Of C2 Contingency Steps" section of PDF file) This is a time dependent variable, specify “contingencyLoiterType_nonDim” as many times as it changes during the flight (only one contingency loiter type at any given time).	TD	CON.2
contingencyLoiterAlt_ft	STRING	Specify list of contingency loiter altitude(s) in the following format: ”[LoiterAlt_1],[LoiterAlt_2],....[LoiterAlt_n]" (include quotation marks). e.g. At a given moment, for 3 different loiter altitudes a valid value of contingencyLoiterAlt_ft could be "[300],[250],[350]" This is a time dependent variable (UTC time stamped), specify “contingencyLoiterAlt_ft” as many times as the loiter altitude settings change during the flight (e.g. for a fixed loiter altitude it’ll have the same value of [LoiterAlt_n] all along the flight) Expressed in WGS84 standard (ft)	TD	CON.2
contingencyLoiterRadius_ft	STRING	Specify list of contingency loiter radius(es) in the following format: ”[LoiterRadius_1],[LoiterRadius_2],....[LoiterRadius_n]" (include quotation marks). e.g. At a given moment, for 3 different loiter radiuses a valid value of contingencyLoiterRadius_ft could be "[100],[30],[55]" This is a time dependent variable (UTC time stamped), specify “contingencyLoiterRadius_ft” as many times as the contingency loiter radius settings change during the flight (e.g. for a fixed loiter radius it’ll have the same value of [LoiterRadius_n] all along the flight)	TD	CON.2

contingencyPlan	Refer to SwaggerHub link	UAS operator and the USS must ensure that the following variables specified in the UTMMessage section of the corresponding swaggerHub page are submitted to the UDC: message_id* ; origin* ; originator_id* ; gufi ; sent_time* ; severity* ; message_type* (all mandatory for CON.2) https://app.swaggerhub.com/domains/utm/commons/v3#/models/UTMMessage	Refer to SwaggerHub link	CON.2
UTM Environment This is a section of a single CON PDF file and a companion KML file.	PDF & KML files	Section name: CON 2-UTM Environment The PDF will contain a diagram that presents the full UTM ecosystem used for CON 2. This should include which USSs were involved (and identify which one was the primary test USS), GCSs connected, and vehicles controlled. Any additional clients or services should be included as well (e.g., public portal). The KML should include the instance data for each USS (geographies and time window as a note). (Same as CON.4-UTM Environment)	TI	CON.2
interfaceAndProceduresData	Observation, questionnaires & debrief	This information will be captured through Human Factors Surveys, to be provided by NASA before the flight tests take place (completing those surveys is mandatory) Topics to cover: What was the role of the operator in responding to the emergency and the involvement in the contingency? What was the procedure followed by the operator during the contingency maneuver? What was the workload of the operator during the emergency/contingency? What was the situational awareness of the operator at time of emergency and contingency? What was the situational awareness of the other operators in the LUN at time of emergency declaration and contingency maneuver? Was the situation and accompanying information sufficiently salient to react appropriately? Were operation volumes planned to account for contingencies? If so, what considerations were included for the planning?	TI	CON.2
Contingency Flow This is a section of a single CON PDF file	PDF	Section name: CON.2-Contingency Flow The PDF should provide documentation on the process for initiating and executing contingency procedures in a UTM operating environment.	TI	CON.2
UTM TCL3 CON PDF Template	PDF	UTM TCL3 CON PDF Template - guidelines A template will be provided by NASA for the elaboration of this report. It is important to follow the file naming format as our software will sort files based on the name. File name format: UTM-{yourOrganizationName}-CON-{0} or{1,2…n}.pdf	TI	CON.1, CON.2, CON.4 (one single "CON" PDF file for the three tests, or for whichever CON tests

		Example: - If all the CON flight (i.e. GUFI) PDF files have the same content then the file name will be: UTM-UASORG-CON-0.pdf - If a few CON flight (i.e. GUFI) PDF files have the same content then each version of the file name will be UTM-UASORG-CON-1.pdf, UTM-UASORG-CON-2.pdf, UTM-UASORG-CON-3.pdf …. n.pdf - If all the CON flight (i.e. GUFI) PDF files have different content then each file name will be UTM-UASORG-CON-1.pdf, UTM-UASORG-CON-2.pdf, UTM-UASORG-CON-3.pdf …. n.pdf		are performed)
UTM TCL3 CON KML Template	KML	UTM TCL3 CON KML Template A template will be provided by NASA for the elaboration of this file. It is important to follow the file naming format as our software will sort files based on the name. File name format: UTM-{yourOrganizationName}-CON-{0} or{1,2…n}.kml Example: - If all the CON flight (i.e. GUFI) KML files have the same content then the file name will be: UTM-UASORG-CON-0.kml - If a few CON flight (i.e. GUFI) KML files have the same content then each version of the file name will be: UTM-UASORG-CON-1.kml, UTM-UASORG-CON-2.kml, UTM-UASORG-CON-3.kml …. n.kml - If all the CON flight (i.e. GUFI) PDF files have different content then each file name will be: UTM-UASORG-CON-1.kml, UTM-UASORG-CON-2.kml, UTM-UASORG-CON-3.kml …. n.kml	TI	CON.2, CON.4 (one single KML file if doing both tests concurrently)

CON.3-Public Portal

Variable Name	Type	Description	Time Dependent (TD) / Independent (TI)	Required by
Public Portal Document	PDF	CON.3-Public Portal Document The public portal developed as part of CON 3 needs to be tested and documented. A template will be provided by NASA for the elaboration of this file, which should be submitted at the conclusion of this test. It is important to follow the file naming format as our software will sort files based on the name. File name format: UTM-{yourOrganizationName}-CONPublicPortal.pdf The final deliverable for the Public Portal test will be a report delivered to the NASA CON3 test POC - Jeffrey Homola [jeffrey.r.homola@nasa.gov]	TI	CON.3

CON.4-Multiple TCL-2/3 operations for a sustained period

Variable Name	Type	Description	Time Dependent (TD) / Independent (TI)	Required by
operationPlanInfo	Refer to SwaggerHub link	UAS operator and the USS must ensure that ALL the mandatory variables (identified with a red asterisk) specified in the OperationVolume section of the corresponding swaggerHub page are submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/OperationVolume	Refer to SwaggerHub link	CON.1, CON.2, CON.4, CON.5 (report once if doing 2 or more tests concurrently)
Scenario Descriptions This is a section of a single CON PDF file and a companion KML file.	PDF & KML	Section Name CON.4-Scenario Descriptions •Each flight must have a mission or use case that it is performing. •Summary of each flight's planned mission and use case with a visual of the flight plans and volumes used as well as the flight's completed trajectory. •Higher level summary that describes how all of the operations interacted. •Timeline/schedule of what operations were performed.	TI	CON.4
UTM Environment This is a section of a single CON PDF	PDF & KML	Section Name: CON.4-UTM Environment The PDF will contain a diagram that presents the full UTM ecosystem used for CON 4. This should include which USSs were involved (and identify which one was the primary test USS), GCSs	TI	CON.4

file and a companion KML file.		connected, and vehicles controlled. Any additional clients or services should be included as well (e.g., public portal). The KML should include the instance data for each USS (geographies and time window as a note). Refer to CON.2-UTM Environment for example		
UTM TCL3 CON PDF Template	PDF	UTM TCL3 CON PDF Template - guidelines A template will be provided by NASA for the elaboration of this report. It is important to follow the file naming format as our software will sort files based on the name. File name format: UTM-{yourOrganizationName}-CON-{0} or{1,2…n}.pdf Example: - If all the CON flight (i.e. GUFI) PDF files have the same content then the file name will be: UTM-UASORG-CON-0.pdf - If a few CON flight (i.e. GUFI) PDF files have the same content then each version of the file name will be UTM-UASORG-CON-1.pdf, UTM-UASORG-CON-2.pdf, UTM-UASORG-CON-3.pdf …. n.pdf - If all the CON flight (i.e. GUFI) PDF files have different content then each file name will be UTM-UASORG-CON-1.pdf, UTM-UASORG-CON-2.pdf, UTM-UASORG-CON-3.pdf …. n.pdf	TI	CON.1, CON.2, CON.4 (one single "CON" PDF file for the three tests, or for whichever CON tests are performed)
UTM TCL3 CON KML Template	KML	UTM TCL3 CON KML Template A template will be provided by NASA for the elaboration of this file. It is important to follow the file naming format as our software will sort files based on the name. File name format: UTM-{yourOrganizationName}-CON-{0} or{1,2…n}.kml Example: - If all the CON flight (i.e. GUFI) KML files have the same content then the file name will be: UTM-UASORG-CON-0.kml - If a few CON flight (i.e. GUFI) KML files have the same content then each version of the file name will be: UTM-UASORG-CON-1.kml, UTM-UASORG-CON-2.kml, UTM-UASORG-CON-3.kml …. n.kml - If all the CON flight (i.e. GUFI) PDF files have different content then each file name will be: UTM-UASORG-CON-1.kml, UTM-UASORG-CON-2.kml, UTM-UASORG-CON-3.kml …. n.kml	TI	CON.2, CON.4 (one single KML file if doing both tests concurrently)

CON.5-FIMS/USS interaction when vehicle heads towards controlled or unauthorized airspace

Variable Name	Type	Description	Time Dependent (TD) / Independent (TI)	Required by
operationPlanInfo	Refer to SwaggerHub link	UAS operator and the USS must ensure that ALL the mandatory variables (identified with a red asterisk) specified in the OperationVolume section of the corresponding swaggerHub page are submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/OperationVolume	Refer to SwaggerHub link	CON.1, CON.2, CON.4, CON.5 (report once if doing 2 or more tests concurrently)
constraintGeography	Refer to SwaggerHub link	UAS operator and the USS must ensure that the constraint_geography GeoJSon polygon information as a part of the ConstraintMessage section of the corresponding swaggerHub page is submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/ConstraintMessage	Refer to SwaggerHub link	CON.5
constraingGeographyEffectiveTimeBegin	Refer to SwaggerHub link	UAS operator and the respective USS must ensure that the effective_time_begin information as a part of the ConstraintMessage section of the corresponding swaggerHub page is submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/ConstraintMessage	Refer to SwaggerHub link	CON.5
constraingGeographyEffectiveTimeEnd	Refer to SwaggerHub link	UAS operator and the respective USS must ensure that the effective_time_end information as a part of the ConstraintMessage section of the corresponding swaggerHub page is submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/ConstraintMessage	Refer to SwaggerHub link	CON.5
unauthorizedAirspaceProximity	Refer to SwaggerHub link	UAS operator and the respective USS must ensure that the message_type information as a part of the UTMMessage section of the corresponding swaggerHub page is submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/UTMMessage	Refer to SwaggerHub link	CON.5
unauthorizedAirspaceEntry	Refer to SwaggerHub link	UAS operator and the respective USS must ensure that the message_type information as a part of the UTMMessage section of the corresponding swaggerHub page is submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/UTMMessage	Refer to SwaggerHub link	CON.5

distFromBoundary_ft	FLOAT	This is the lateral distance in feet, between the vehicle and unauthorized airspace boundary. If the vehicle did not breach the airspace, the value would be positive. If the vehicle breached the boundary, the value would be negative. This is a time dependent variable (UTC time stamped). (ft)	TD	CON.5
unauthorizedAirspaceStatus_nonDim	INTEGER	Report if the vehicle is within the constraint geography (unauthorized airspace), specify an integer value for either airspace status, for the duration of the flight: 0 = UAS is located in AUTHORIZED airspace 1 = UAS is located in UNAUTHORIZED airspace e.g. if the vehicle never entered an unauthorized area, then unauthorizedAirspaceStatus_nonDim = 0 for the whole flight. This is a time dependent variable (UTC time stamped), report every change of airspace status as many times as it occurs during the flight.	TD	CON.5
interfaceAndProceduresData	Observation, questionnaires & debrief	This information will be captured through Human Factors Surveys, to be provided by NASA before the flight tests take place (completing those surveys is mandatory) Topics to cover: Were you alerted to the following: breach of operation volume, nearing unauthorized airspace, breaching unauthorized airspace? If so, how and when? Was the timing adequate? What information was used for awareness of nearing constraint and avoidance maneuvering? How useful were the messages received? What additional information would have been helpful in this situation? What were the procedures and actions performed to clear the unauthorized airspace?	TI	CON.5
ussInstance.coverage_area	Refer to SwaggerHub link	UAS operator and the respective USS must ensure that the following variables under the USS instance section of the corresponding swaggerHub page are submitted to the UDC: https://app.swaggerhub.com/domains/utm/commons/v3#/models/UssInstance uss_instance_id* ; uss_name ; tiime_submitted ; time_available_begin* ; time_available_end* ; coverage_area* ; time_last_modified (all mandatory for CON.5)	Refer to SwaggerHub link	CON.5

HUMAN FACTORS

- There will be information related to Human Factors collected through online surveys, questionnaires & debriefings. The link(s) will be sent by NASA's Human Factors POC. Providing this Human Factors data is mandatory for ALL tests.