Old Dominion University

Engineering Management and Systems Engineering Department

Unmanned Aircraft System Acquisition in Support of Sea Range Surveillance and Clearance

Rountree, Robert D.

rroun001@odu.edu

robert.rountree12@gmail.com

ENMA 604, CRN 32986

UNMANNED AIRCRAFT SYSTEM ACQUISITION IN SUPPORT OF SEA RANGE SURVEILLANCE AND CLEARANCE

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UNMANNED AIRCRAFT SYSTEM ACQUISITION IN SUPPORT OF SEA RANGE SURVEILLANCE AND CLEARANCE

1.0 GENERAL DESCRIPTION

1.1 Background

The Pacific Coast Sea Range (PCSR) is a unique complex encompassing over 30,000 square miles of controlled airspace over open ocean. The PCSR is utilized routinely in Research, Development, and Test and Evaluation (RDT&E) activities for the U.S. Navy, hosting numerous scenarios including live-fire events with high-speed unmanned aerial targets and missiles. Range Surveillance and Clearance (RS&C) is conducted before these events occur to ensure the safety of nearby ships and aircraft. Test Squadron 3 (TS3) is investigating aircraft capable of conducting RS&C to replace their aging fleet of P-3C Orions. It is hypothesized that Unmanned Aircraft Systems (UAS) may be able to provide suitable RS&C performance at a reduced total ownership cost.

1.2 Project Purpose

The purpose of this project is to investigate the potential for an Unmanned Aircraft System (UAS) to support the RS&C mission as a lower-cost replacement for existing assets, and subsequently to acquire a suitable UAS.

2.0 STATEMENT OF WORK

General Aviation Systems, Inc. (GAS), agrees to work with U.S. Navy Test Squadron 3 (TS3) to provide MQ-1B aircrew and maintenance training, to furnish Ground Control Stations (GCS) and Ground Support Equipment (GSE), to integrate and verify Surface Search radars and Electro-Optical (EO) / Infra-red (IR) sensors, to furnish a MQ-1B simulator, and to provide contractor on-site support prior to a successful Range Surveillance and Clearance (RS&C) test flight. This agreement was made based on the

Request for Proposal (RFP) from the Naval Air Warfare Center (NAWC). TS3 will receive all equipment necessary to consistently operate two MQ-1B aircraft simultaneously from the same location daily, and to conduct simultaneous MQ-1B operations at up to four separate sites. This will include at a minimum: 4 fully operational Block II GCS compatible with TS3 Block II.2 MQ-1B fleet, all necessary GSE, and all tools and parts required for daily MQ-1B operations. GAS will outfit 4 MQ-1B airframes of TS3's choice with one of each: APS-1 Surface Search radar system and MTS-B EO/IR sensor. GAS will also furnish a fully operational Block II MQ-1B simulator in TS3 Building 123. TS3 personnel will receive 6-week aircrew and maintenance training courses at GAS facilities. One GAS Air Vehicle Operator (AVO) and one maintenance technician will provide on-site support from delivery of the first GCS until successful completion of an MQ-1B RS&C test flight, not to exceed 90 days. GAS will be paid through a fixed-price contract starting in June 2021 and ending in June 2022 and will receive $3M upon successful delivery of the fourth operational GCS, and $1M upon successful completion of an MQ-1B RS&C test flight.

GAS will deliver and perform functional checks of all equipment. When all equipment has arrived, GAS will lead TS3 personnel in conducting integrated system checks of all MQ-1B components and the MQ-1B simulator. All equipment must be fully operational. GAS will provide training and initial qualifications to all TS3 aircrew and maintenance personnel during training at GAS facilities. TS3 will use MQ-1B airframes, GAS-furnished GCS, GSE, and MQ-1B simulator, and GAS training to conduct routine RS&C missions on the PCSR, with daily flights of up to three MQ-1B, and operations across as many as four separate sites.

GAS will provide all equipment delineated above, aircrew and maintenance training and access to facilities, and on-site contractor support. TS3 will provide complete MQ-1B airframes, access to personnel, and access to spaces and facilities.

3.0 GENERAL ASSUMPTIONS

- Airframes will be acquired via transfer from the U.S. Navy Targets Division (USNTD). General Aviation, Inc., has been selected to provide aircrew and maintenance training, as well as a simulator, Ground Control Stations (GCS), Support Equipment (SE), and on-site contract support from aircraft delivery to successful completion of an RS&C test flight.
- The names of many entities and technical specifications have been redacted in the interest of preserving official-use information. All platform and sensor specifications were found in the public domain.
- The cost estimates depicted in Table 14 are assumed to be accurate for the purposes of this project.
- This project assumes that MQ-1B airframes can be acquired through transfer free of charge, with refurbishment expenditures to include labor and parts provided by GAS.
- Assumes no major regulatory hurdles to integrate MQ-1B operations in RS&C.
- Assumes TS3 gains full financial backing from NAWC and PCSR.
- Assumes a full platform AoA was conducted in which the MQ-1B was chosen as the UAS platform for acquisition due to its combination of cost and capabilities.

- Assumes a Request For Proposal (RFP) was sent out regarding contractors available to provide MQ-1B services and training and the contract was won by GAS.
- Assumes no unforeseen issues in equipment check outs and sensor integration.
- Assumes TS3 is able to assign personnel to the project in accordance with (IAW) the WBS delineated in Table 1.
- Assumes TS3 is able to attain and support organic (non-contract) aircrew and maintenance personnel IAW the Resource Loading Chart.

  Assumes no time buffers built in to schedules/contracts.
- Assumes existing TS3 spaces are sufficiently large to store the necessary equipment.

4.0 STRATEGIC IMPORTANCE

This project is vitally important to the TS3 and DoD long-term strategic outlooks and will support TS3 medium-term strategic objectives. Continuing alignment with TS3 and DoD strategy will be assured through periodic reviews conducted at project milestones. The project will research, select, and acquire a suitable UAS to conduct the RS&C mission at TS3. Though the primary purpose of UAS acquisition will be to support the RS&C mission, decision makers will also consider the UAS capability to perform other mission sets in their Analysis of Alternatives (AoA). The project is anticipated to save NAWC and the DoD $67M over the 10-year aircraft life[1] by providing a lower-cost RS&C asset compared to the existing P-3C Orion RS&C assets. The importance of RS&C assets in particular and their alignment to DoD acquisition, test, and development

[1] Based on the total O&S methodology detailed in reference 1.

strategy is apparent through their necessity in ensuring the safety of hundreds of weapons and unit tests in the PCSR each year. If RS&C assets are unavailable to ensure Range safety, programs that were scheduled for the PCSR will have to cancel their event and delay to a later date, which may not be available for weeks or months. Availability of RS&C assets can therefore the affect the schedule, and cost of numerous major RDT&E programs employing hundreds of engineers and managers, as well as dozens of Range support and Telemetry personnel.

Additionally, the project will provide four highly capable, long-endurance UAS assets which can be used for additional RDT&E efforts. This will meet TS3 and DoD objectives by providing a low-cost yet capable alternative platform in which to integrate test payloads in initial risk-reduction flights. Example uses could include Electronic Warfare, autonomy software, and directed energy testing, fulfilling long-term, high-priority DoD research, development, and technology objectives.

5.0 WORK BREAKDOWN STRUCTURE

An indented Work Breakdown Structure is depicted in Table 1.

Table 1: Work Breakdown Structure

#	Activity	Start	End
1.0	**Initial Concept Development**		
1.1	Requirements Generation	Mon, 10/5/20	Fri, 10/16/20
1.2	Platform-Specific Initial CONOPS Development	Mon, 10/19/20	Fri, 11/6/20
1.3	Initial Platform Financial and Multi-Criteria Analysis	Mon, 11/9/20	Fri, 11/20/20
1.4	Command Project Review and Continuation Board	Mon, 11/23/20	Fri, 12/4/20

2.0	**Project Selection**		
2.1	Detailed Analysis	Mon, 12/7/20	Fri, 12/25/20
2.1.1	Fine CONOPS Development	Mon, 12/7/20	Fri, 12/25/20
2.1.2	RFP Solicitation	Mon, 12/7/20	Fri, 12/18/20
2.1.3	Training/Acquisition Plan Development	Mon, 12/7/20	Fri, 12/18/20
2.1.4	Initial Scheduling	Mon, 12/21/20	Fri, 12/25/20
2.2	Analysis of Alternatives	Mon, 12/28/20	Mon, 1/4/21
2.2.1	MCDM Matrix Generation	Mon, 12/28/20	Thu, 12/31/20
2.2.2	Financial Model Generation	Mon, 12/28/20	Thu, 12/31/20
2.2.3	SME Ranking	Fri, 1/1/21	Fri, 1/1/21
2.3	Project Decision	Mon, 1/4/21	Fri, 2/5/21
2.3.1	Squadron Leadership Briefing	Mon, 1/4/21	Fri, 1/8/21
2.3.2	Senior Leadership Briefing	Mon, 1/11/21	Fri, 1/15/21
2.3.3	Final Project Selection Decision	Mon, 1/18/21	Fri, 2/5/21
2.4	Contract Award	Mon, 2/8/21	Fri, 5/21/21
2.4.1	Fine Training Plan Development	Mon, 2/8/21	Fri, 2/19/21
2.4.2	Fine Acquisition Plan Development	Mon, 2/8/21	Fri, 2/19/21
2.4.3	Fine Integration Plan Development	Mon, 2/8/21	Fri, 2/19/21
2.4.4	Updated Scheduling	Mon, 2/22/21	Fri, 2/26/21
2.4.5	Contract Award	Mon, 3/1/21	Fri, 5/21/21
3.0	**Acquisition**		
3.1	Training	Mon, 5/24/21	Fri, 7/2/21
3.1.1	Aircrew Training	Mon, 5/24/21	Fri, 7/2/21
3.1.2	Maintenance Training	Mon, 5/24/21	Fri, 7/2/21
3.2	Airframe Acquisition	Mon, 5/24/21	Fri, 7/30/21
3.2.1	Airframe Delivery	Mon, 5/24/21	Fri, 6/4/21
3.2.2	Airframe Maintenance	Mon, 6/7/21	Fri, 7/30/21
3.3	Equipment Delivery	Mon, 5/24/21	Fri, 7/16/21
3.3.1	GCS Delivery	Mon, 5/24/21	Fri, 7/16/21
3.3.2	Simulator Delivery	Mon, 5/24/21	Fri, 7/16/21
3.3.3	GSE Delivery	Mon, 5/24/21	Fri, 7/16/21
3.3.4	Tools/Parts Delivery	Mon, 5/24/21	Fri, 7/16/21
3.3.5	Sensors Delivery	Mon, 5/24/21	Fri, 7/16/21
3.4	Simulator Check-out	Mon, 7/19/21	Fri, 7/23/21

4.0	**Initial Testing**		
4.1	Platform Test Planning	Mon, 5/24/21	Fri, 6/18/21
4.2	Ground Testing	Mon, 7/19/21	Fri, 9/3/21
4.2.1	Subsystem Testing	Mon, 7/19/21	Fri, 8/6/21
4.2.2	Airframe Ground Testing	Mon, 8/9/21	Fri, 8/20/21
4.2.3	Integrated Ground Testing	Mon, 8/23/21	Fri, 9/3/21
4.3	Flight Testing	Mon, 9/6/21	Fri, 10/1/21
4.3.1	Flight Readiness Review	Mon, 9/6/21	Fri, 9/17/21
4.3.2	Platform Flight Testing	Mon, 9/20/21	Fri, 10/1/21
4.4	Platform Flight Test Reporting	Mon, 10/4/21	Fri, 10/29/21
5.0	**Integrated Testing**		
5.1	Sensors / RS&C Test Planning	Mon, 10/4/21	Fri, 10/22/21
5.2	Sensors Testing	Mon, 10/25/21	Fri, 12/10/21
5.2.1	Sensors Ground Testing	Mon, 10/25/21	Fri, 11/5/21
5.2.2	Integrated Sensors Ground Testing	Mon, 11/8/21	Fri, 11/19/21
5.2.3	Sensors Flight Testing	Mon, 11/22/21	Fri, 12/10/21
5.3	RS&C Test Flight	Mon, 12/13/21	Fri, 12/31/21
5.4	Simulator Verification and Validation	Mon, 1/3/22	Fri, 1/14/22
5.5	Sensors / RS&C Flight Test Reporting	Mon, 1/3/22	Fri, 1/28/22

6.0 SUMMARY OF TECHNICAL SPECIFICATIONS

P-3C Orion

Patrol speed: 206 KCAS

Range: 1,345 nmi

Endurance: 12 hours 20 minutes

Minimum crew: 2x Pilots, 1x Navigator, 1x Flight Engineer, 1x Radar Operator, 1x Observer, plus maintenance personnel.

Required fuel: Up to 62,500 lbs

APS-115 radar (notional 40 nmi range)

AXS-4 AIMS sensor (notional 20 nmi range, weather dependent)

Radar clearance capability: 17,320 sq. nmi / hr

MQ-1B Predator

Speed: 70 KCAS

Range: 675 nmi / Line of Sight

Endurance: 24 hours

Minimum crew: 1x Remote pilot, 1x Backup Pilot, and 1x Sensor Operator.

Required Fuel: <1,000 lbs

APS-1 radar (throughput limited)

MTS-B sensor

Radar clearance capability: 4676 sq. nmi / hr

APS-1 Surface Search Radar (notional)

Cost: $2M

Maximum detection range: 30 nmi

MTS-B EO/IR Sensor (notional)

Cost: $2M

Max Range: 15 nmi (weather dependent)

PCSR RS&C Requirements (notional)

Ability to clear 14,500 square nmi sea space in 3 hours

7.0 STAKEHOLDER ANALYSIS

Table 2: Stakeholder Analysis

Stakeholders	How are stakeholder interests aligned with project interests?	How formally is stakeholder linked to the project?	What power does stakeholder exert over project execution and deliverables?	Does stakeholder past performance affect the stakeholder management process?
NAWC	NAWC interests are aligned with Project Goals with an emphasis on low cost and long-term financial independence.	Formally. NAWC is providing funding for training, operations, and support, IAW PCSR/TS3 request.	NAWC exercises near-full control over the project, able to affect personnel, operations, and support funding.	Yes. NAWC has typically been very risk-averse, slow to adopt new unproven capabilities, and requires long lead times.
PCSR	PCSR interests are aligned with project goals, with an emphasis on safety, platform capability to support customer needs, and reasonable operations costs.	Formally. PCSR is providing funding for EO/IR sensor and radar integration. PCSR will assign MQ-1 assets to missions based on safety, test results, and proven capability.	PCSR controls funding for integration costs, and as such can directly affect platform capability. PCSR also designates MQ-1B assets to missions based on capability and customer RS&C requests, impacting long-term financial viability.	Yes. PCSR has been risk-averse and slow to adopt new, unproven technologies, and requires long lead times.

Stakeholders	How are stakeholder interests aligned with project interests?	How formally is stakeholder linked to the project?	What power does stakeholder exert over project execution and deliverables?	Does stakeholder past performance affect the stakeholder management process?
Customers	Customer interests are aligned with project goals, specifically high performance and low cost.	Informally. Customers will be provided by PCSR. PCSR requirements for RS&C are driven by customer needs. Customer buy-in is required for PCSR to deploy MQ-1B to support test missions.	Customers will not directly impact project execution but will impact project long-term viability through acceptance of UAS providing RS&C.	No.
TS3 Leadership	TS3 leadership interests are aligned with project goals. Politics may become a factor in TS3 negotiations with upper management.	Formally. TS3 is project sponsor.	TS3 leadership approves all project deliverables, execution, and timelines.	Yes. TS3 leadership is supportive of well-thought out projects, and will work to attain approval from higher authority.
Test and Experimentation Coordination Team (TECT)	TECT interests are mostly aligned with project goals. TECT interests are primarily project safety and ensuring technical rigor.	Formally. All test events must go through TECT approval.	TECT approval is required prior to all test events. 2-week lead time is required for Test Plan review.	No.

Stakeholders	How are stakeholder interests aligned with project interests?	How formally is stakeholder linked to the project?	What power does stakeholder exert over project execution and deliverables?	Does stakeholder past performance affect the stakeholder management process?
USNTD	USNTD interests are partially aligned with project goals. USNTD desires greater MQ-1B infrastructure and access to expertise and personnel. USNTD is supportive of TS3 MQ-1B operations other than target operations.	Formally. USNTD is providing MQ-1B airframes to TS3 at no charge.	Reversal of USNTD decision to grant MQ-1B assets to TS3 would require significant project re-work and re-planning.	Yes. USNTD and TS3 generally work well together but occasionally run into territorial issues, both in physical space and mission sets.
GAS	GAS interests are generally aligned with project goals. However, GAS is incentivized to increase price and reduce performance as much as allowable per the contract.	Formally. The SOW is between GAS and TS3, in which GAS provides sensor integration, four GCS, GSE, tools, training of personnel, and a simulator.	GAS performance will directly drive deliverables to include the first MQ-1B test events.	No. No knowledge on GAS practices are available at this time.
Airworthiness Office	Airworthiness office interests are aligned with project goals for safety, but not schedule or cost.	Formally. An Interim Flight Clearance (IFC) is required prior to MQ-1B flight.	Airworthiness Office approval and IFC issue is required prior to flight.	Yes. The Airworthiness Office requires significant amounts of technical documentation and requires long lead times.

Stakeholders	How are stakeholder interests aligned with project interests?	How formally is stakeholder linked to the project?	What power does stakeholder exert over project execution and deliverables?	Does stakeholder past performance affect the stakeholder management process?
FAA	FAA interests are safe UAS operations and non-interference with civil operations.	Formally. An FAA Certificate of Authorization (COA) for operations in military Class D National Airspace is highly desired.	A COA from the FAA is highly desired for the project and is required to operate in Class D airspace.	Yes. COA lead times are advertised as 90 days but are typically much lower.
Base Environmental	Environmental goals are aligned with project goals regarding safety and sustainability, but not cost, performance, or schedule.	Formally but in a minor capacity. Environmental approval is required for test flights and routine squadron inspections.	Environmental concerns could require changes to test plans, operations, and maintenance procedures and materials.	Yes. Environmental issues have not been encountered in test plans. Hazardous material concerns have been minor and routine in historic MQ-1B operations.
Airfield Safety	Airfield safety goals are aligned with project goals regarding safety and sustainability, but not cost, performance, or schedule.	Formally. Airfield safety approval is required for placement of MQ-1B GCSs and GSE.	Airfield safety could require MQ-1B GCS or GSE be moved to non-optimal locations, or moved before every flight, significantly impacting operations.	Yes. Airfield safety has historically required significant documentation and long lead times (2-3 months).
Airfield Tower	Airfield tower interests are safety and smooth airfield operations, largely aligned with project goals.	Formally. Airfield tower permission is required to fly UAS in airfield airspace and to integrate into normal airfield operations.	Airfield tower could require airspace shut down prior to MQ-1B flight operations, increasing operations lead time by approx.. 1 hour.	Yes. The airfield has been very accommodating in previous UAS projects.

Stakeholders	How are stakeholder interests aligned with project interests?	How formally is stakeholder linked to the project?	What power does stakeholder exert over project execution and deliverables?	Does stakeholder past performance affect the stakeholder management process?
Spectrum Management	Spectrum Management interests are aircraft non-interference with its own and other frequencies – aligned with project goals for safety, but not cost, schedule, or performance.	Formally. Spectrum Management clearance is required prior to airfield operations and is required to attain IFC (required prior to flight operations).	Spectrum Management requirements to change frequencies, reduce power, etc., could require aircraft equipment replacement or procedural changes resulting in cost increases and delays.	Yes. Thorough testing with Spectrum Management is required months before first scheduled flight. Frequencies and power settings should be discussed prior to system acquisition.

Table 3: Stakeholder Analysis (cont'd)

Stakeholders	How are the alignment and misalignment dealt with?	How will the approach be implemented?	How will stakeholder satisfaction be measured?	How will stakeholder performance be measured?
NAWC	NAWC and TS3 will work together to define project goals to ensure interests are properly aligned with project goals.	NAWC will establish project management and cost guidelines, as well as milestones that will drive the project approach.	NAWC satisfaction will be assessed at milestone reviews. TS3 will keep NAWC representatives informed regarding cost and vendor issues. Cost, schedule, and performance metrics.	Timely NAWC support regarding financial and contracting issues.
PCSR	PCSR and TS3 will work together to define project goals to ensure interests are aligned with project goals.	TS3 will work with PCSR to conduct systems integration, and to track integration costs and system capabilities.	PCSR satisfaction will be assessed at monthly project update meetings as well as milestone reviews. Cost, schedule, and performance metrics.	Timely commitment of funds to system integration efforts and associated contracting costs.
Customers	TS3 and PCSR will work to ensure maximum system capability is maintained.	PCSR will assess customer interests periodically to ensure they align with project goals	Customer satisfaction will be assessed by PCSR in RS&C event planning.	Customer interest in use of the MQ-1B as an asset for RS&C.

Stakeholders	How are the alignment and misalignment dealt with?	How will the approach be implemented?	How will stakeholder satisfaction be measured?	How will stakeholder performance be measured?
TS3 Leadership	TS3 leadership alignment will be leverage to advance project goals. Any misalignment will result in discussions or project changes.	TS3 leadership will be briefed on project status and will give feedback at weekly Department meetings.	Leadership satisfaction will be measured through dialogue and directions. Cost, schedule, performance, and political capital are metrics.	Prompt addressing of concerns, including elevation to higher authority if needed.
TECT	TECT alignment will advance project goals, any misalignment will result in modifications to Test Plans.	The TECT will be informed of upcoming tests, requirements, and methods prior to Test Plan draft.	Directly through Test Plan feedback on safety and technical rigor.	Timely return of Test Plans and approval of reasonably safe Test proposals.
USNTD	USNTD alignment will enhance TS3 access to MQ-1B parts, infrastructure, and experience. Misalignment will require greater TS3 independence, and issues will be addressed through dialogue, and higher authority only if needed.	USNTD will be kept informed regarding TS3 acquisition plans. TS3 and USNTD will share information regarding customer, contractor, and range performance and preferences.	TS3 will re-commence attendance at USNTD weekly UAS/Low Speed Aerial Targets (LSAT) meetings, and will solicit USNTD feedback there.	Timely delivery of MQ-1B airframes, providing reasonable amounts of technical and/or logistical assistance.

Stakeholders	How are the alignment and misalignment dealt with?	How will the approach be implemented?	How will stakeholder satisfaction be measured?	How will stakeholder performance be measured?
GAS	The SOW between TS3 and GAS addresses alignment of goals and interests. Misalignment can be managed through contract modifications if needed.	TS3 personnel will be in constant contact with GAS. If needed, NAWC and/or PCSR Contracting Officers will be consulted.	On-time payments by NAWC, PCSR, and TS3. Clarity of contract objectives.	On-time delivery of services delineated in the contract, fulfillment of contract deliverables in good condition, timely feedback in contract updates if needed.
Airworthiness Office	Misalignment will require quick TS3 action to maintain cost and schedule objectives.	The Airworthiness Office will be contacted during initial system acquisition to determine IFC requirements.	Direct results of the IFC review. Metrics are number of corrections, number of requests for additional information.	Timely review of the IFC paperwork, reasonable acceptance of technical paperwork, timely responses to dialogue.
FAA	Misalignment will be dealt with through direct dialogue, airfield input, and possible modifications to procedures.	The FAA will be contacted during creation of airfield Flight Operating Procedures (FOPS) in advance of COA request.	Direct results of COA request review. Metrics are number of corrections, and requests for additional information.	Timely review of COA paperwork and responses to dialogue.
Base Environmental	Misalignment will be managed by clarifying and/or modifying procedures.	Environmental will be contacted in the event of acquisition of new Hazardous Material (HAZMAT), and will be included in Test Plan review.	Requests for additional information regarding materials or procedures, notification of non-compliance with regulations.	Timely review of Test Plans and responses to dialogue.

Stakeholders	How are the alignment and misalignment dealt with?	How will the approach be implemented?	How will stakeholder satisfaction be measured?	How will stakeholder performance be measured?
Airfield Safety	Misalignment will be managed through clarification and/or modification of procedures.	Airfield safety will be asked about GSE and GCS placement prior to Airfield Safety Waiver requests.	Requests for information regarding procedures, notification of non-compliance with regulations.	Timely review of materials, accommodation regarding safe but viable operations.
Airfield Tower	Misalignment will be managed through clarification and/or modification of procedures.	TS3 will work with the airfield Tower to develop FOPS.	Direct dialogue at FOPS development meetings, concerns regarding procedures.	Timely review of materials, accommodation regarding safe and viable operations.
Spectrum Management	Misalignment will be managed through modification of procedures or modifications to equipment.	Spectrum Management will be consulted regarding frequencies prior to system acquisition, and will be provided with historical MQ-1B spectrum data.	Requests for modification to procedures or equipment, notification of non-compliance with regulations.	Timely review of materials, timely conduct of Electromagnetic Interference (EMI) testing, and accommodation regarding safe operations.

8.0 SCHEDULE ANALYSIS

The project schedule can be analyzed through a Program Evaluation Review Technique (PERT) Analysis chart. The PERT Analysis Chart in Table 4 below has been abbreviated to fit the scope of the Project Management course. Activities with identical dependencies, predecessors, and start and end dates have been combined, and activities beyond 4.2.2 (Airframe Ground Testing) are not listed. Metrics in this table to include the probability of the project meeting its deadline are based on project completion at WBS Event 4.2.2. Table 4 is reproduced as a single page in Appendix B.

Table 4: PERT Analysis Chart

Act ID	WBS #	Activity(ies)	Pred	Opt	Most Likely	Pess	Estimate	CP Std Dev	CP Var
1	1.1	Requirements Generation		5	8	15	9	1.67	2.78
2	1.2	Platform-Specific Initial CONOPS Development	1	10	15	30	17	3.33	11.11
3	1.3	Initial Platform Financial and Multi-Criteria Analysis	2	5	10	15	10	1.67	2.78
4	1.4	Command Project Review and Continuation Board	3	3	5	10	6	1.17	1.36
5	2.1.1	Fine CONOPS Development	4	10	15	25	16		
6	2.1.2, 2.1.3	RFP Solicitation, Training/Acquisition Plan Development	4	10	15	20	15	1.67	2.78
7	2.1.4	Initial Scheduling	6	2	4	10	5	1.33	1.78
8	2.2.1, 2.2.2	MCDM Matrix Generation, Financial Model Generation	5, 7	5	10	15	10	1.67	2.78
9	2.2.3	SME Ranking	8	0.5	1	1.5	1	0.17	0.03
10	2.3.1	Squadron Leadership Briefing	9	3	5	10	6	1.17	1.36
11	2.3.2	Senior Leadership Briefing	10	5	10	20	11	2.50	6.25
12	2.3.3	Final Project Selection Decision	11	10	20	40	22	5.00	25.00
13	2.4.1, 2.4.2, 2.4.3	Fine Training Plan, Acquisition Plan, and Integration Plan Development	12	5	10	20	11	2.50	6.25
14	2.4.4	Updated Scheduling	13	3	5	10	6	1.17	1.36

15	2.4.5	Contract Award	14	20	40	80	44	10.00	100.00
16	3.1.1, 3.1.2	Aircrew and Maintenance Training	15	30	30	30	30		
17	3.2.1	Airframe Delivery	15	5	15	30	16		
18	3.2.2	Airframe Maintenance	17	10	30	60	32		
19	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5	GCS, Simulator, GSE, Tools, and Sensor Delivery	15	10	20	40	22	5.00	25.00
20	3.4	Simulator Check-out	19	5	10	15	10		
21	4.1	Platform Test Planning	15	10	15	30	17		
22	4.2.1	Subsystem Testing	19	3	10	20	11	2.83	8.03
23	4.2.2	Airframe Ground Testing	21, 22	5	15	25	15	3.33	11.11

Critical Path Variance	209.75
Critical Path Std. Dev.	14.48

Deadline	230
Critical Path Estimate	221
Z-Score	0.621

Probability of Meeting Deadline	**0.733**

Based on the deadline of 230 working days to complete this portion of the project, and the estimated 221 days to completion, the project has a 73.3% chance of meeting the deadline.

A complete PERT chart for these 23 activities of the project follows in Figure 1 through Figure 3 on the next few pages.

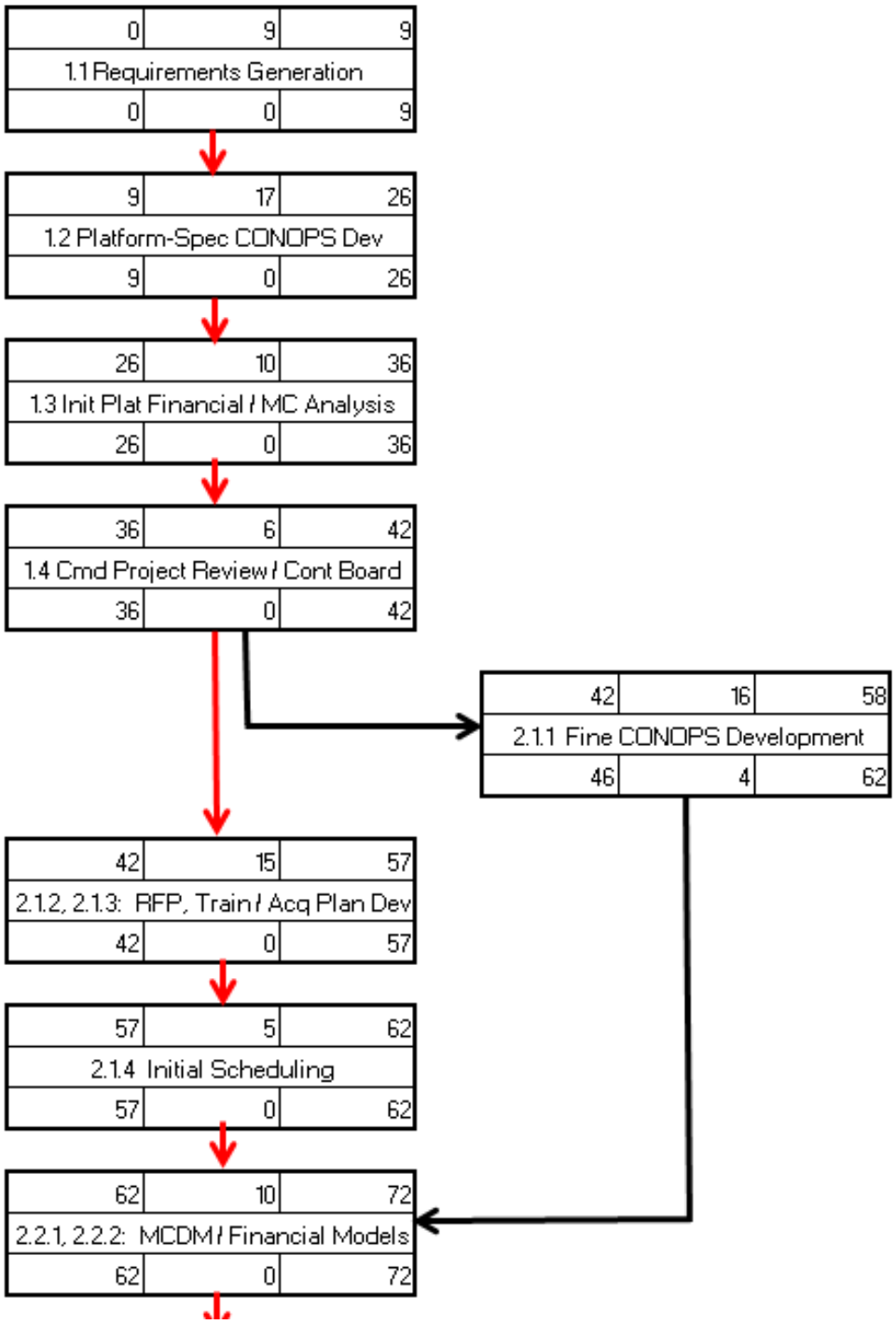

Figure 1: PERT Chart (1 of 3)

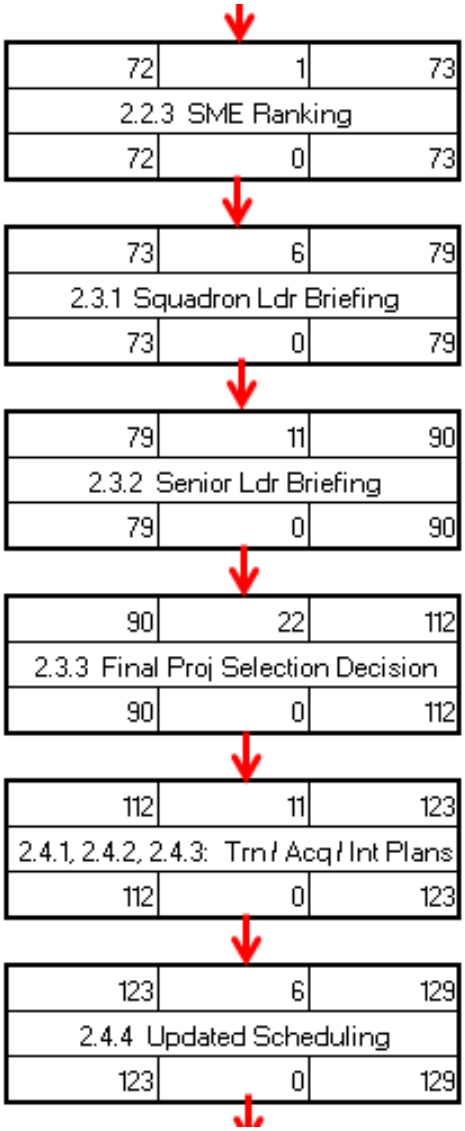

Figure 2: PERT Chart (2 of 3)

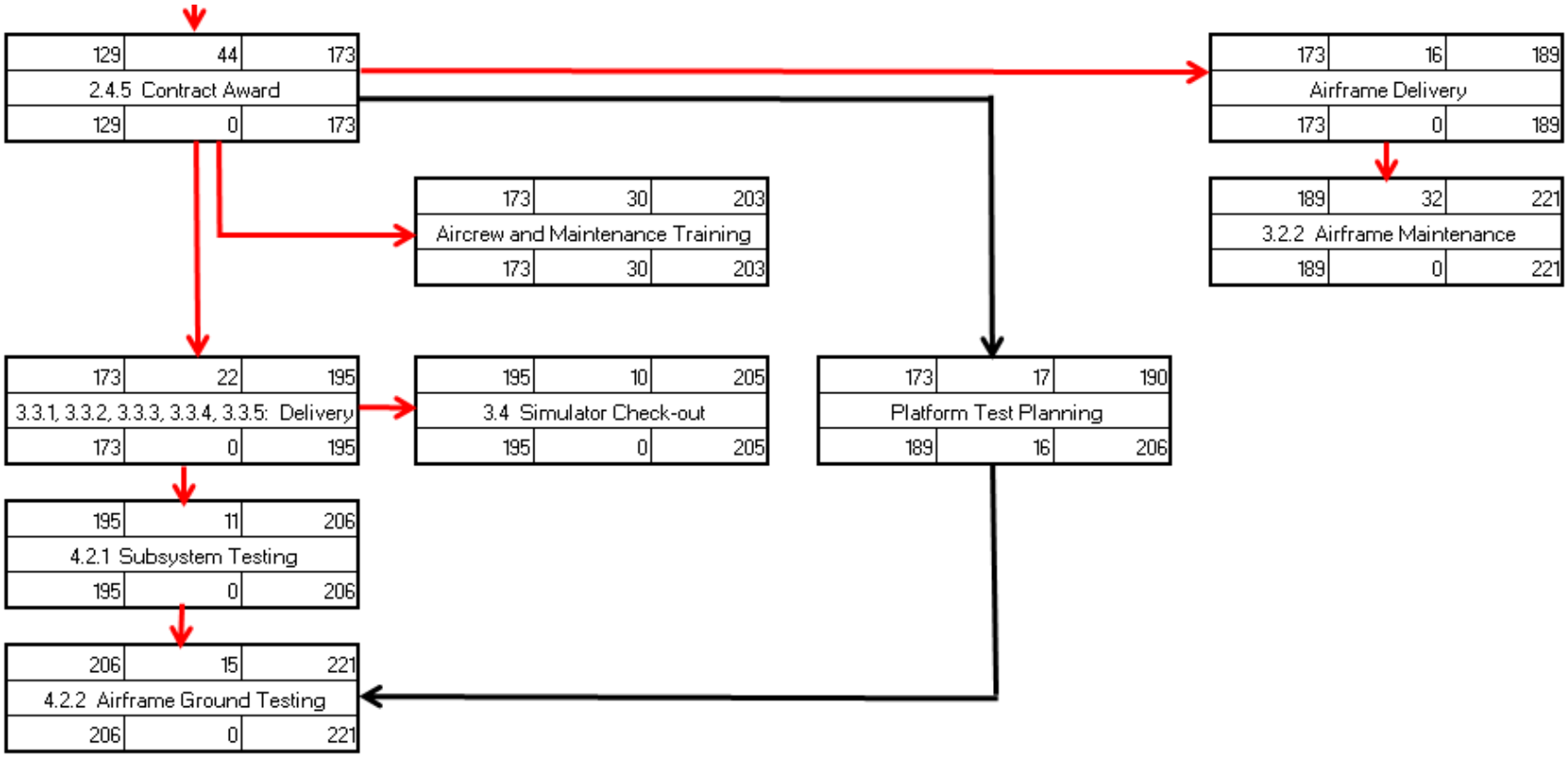

Figure 3: PERT Chart (3 of 3)

A Gantt chart for the entire project is depicted in Figure 4.

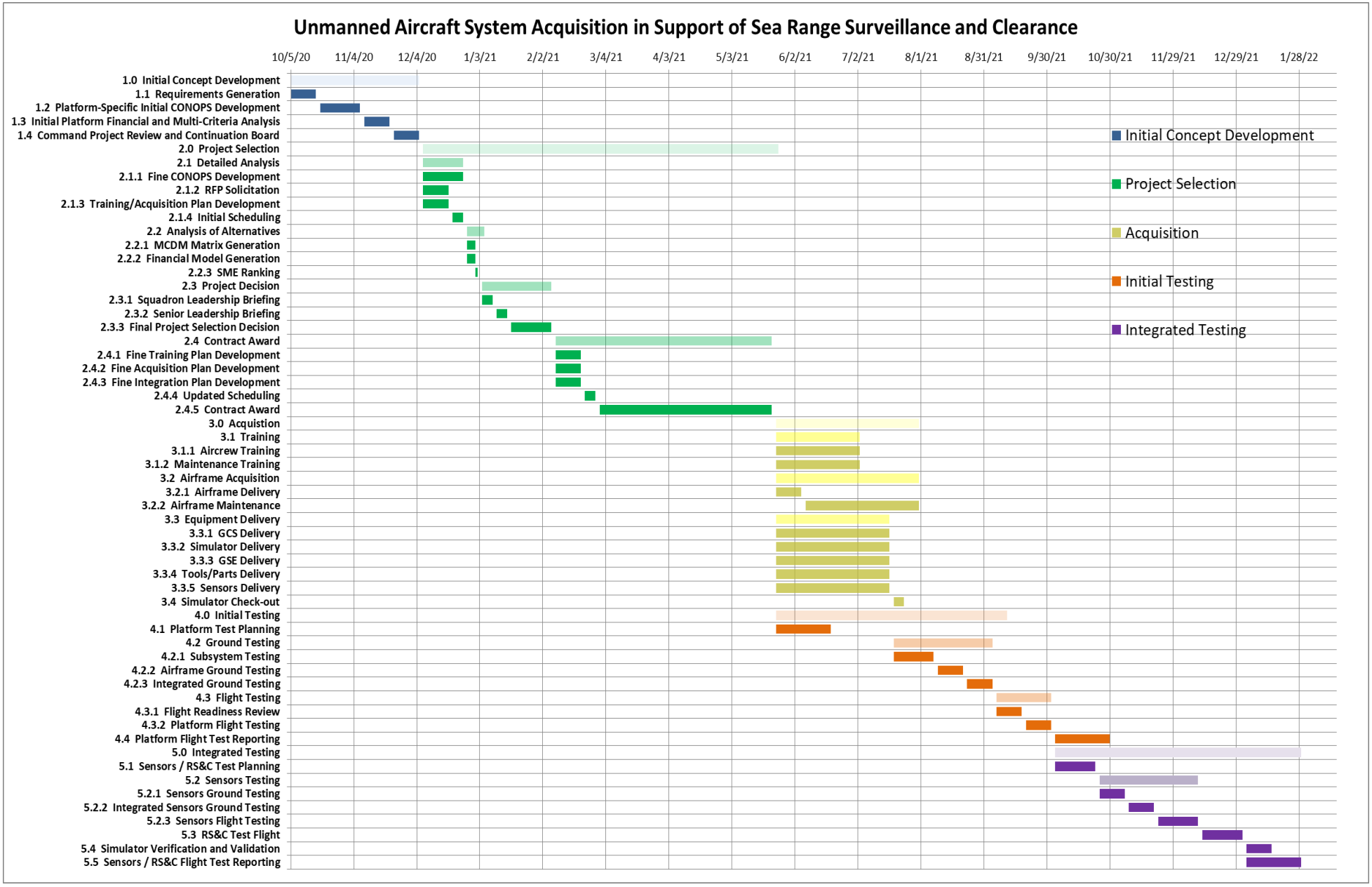

Figure 4: Project Gantt Chart

9.0 RESOURCE LOADING CHART

Due to its extended duration over a year and a half and requirements for personnel to complete other projects while this project is ongoing, the project will be measured in weeks. The Resource Loading Summary chart depicted in Figure 5 identifies the labor resources needed in each week. The chart depicted in Figure 6 depicts monetary resources expended each week for labor and contractor services. A full Resource Loading chart is available in Appendix B, Figure B-2 through Figure B-6.

The Labor Resource Loading Summary highlights several areas requiring full-time work on this project by both aircrew and maintainers in training, as well as maintainers conducting maintenance after initial equipment shipments. The Project Manager (PM) is required to work a small amount of overtime during training off-site. This could be mitigated by assigning an alternate PM while the PM is away at aircrew training.

Understanding the Cost Resource Summary chart requires knowledge that not all personnel have labor charges. While these personnel are ultimately paid by the DoD, they are not required to assign charges to specific projects and have resources available for the project to use “free of charge.” The PM, maintenance Leading Petty Officer (LPO) and Petty Officers (PO), UST Maintenance Officer (MO), and Business Financial Manager (BFM) are required to charge their time to the project. Additionally, materials costs are expected to be incurred by the general contractor (General Aviation Systems (GAS)), and therefore materials costs are not anticipated other than payments to GAS as described in the SOW.

Resource Loading by Week: Labor (hours)

Resource	10/5/20	10/12/20	10/19/20	10/26/20	11/2/20	11/9/20	11/16/20	11/23/20	11/30/20	12/7/20	12/14/20	12/21/20	12/28/20	1/4/21	1/11/21	1/18/21	1/25/21	2/1/21	2/8/21	2/15/21	2/22/21	3/1/21	3/8/21	3/15/21	3/22/21	3/29/21	4/5/21	4/12/21	4/19/21	4/26/21	5/3/21	5/10/21	5/17/21	5/24/21	5/31/21
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
PM	3	3	10	10	10	10	10	5	5	19	21	25	25	20	0	5	10	5	15	15	15	2	2	2	2	2	4	4	4	4	4	4	4	45	45
UST DH	0	1	7	7	6	0	3	2	1	6	6	3	8	5	5	1	1	2	4	4	0	1	1	1	1	1	1	1	1	1	1	1	1	13	13
UST OPS	0	1	7	7	6	0	3	1	1	6	6	1	6	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
UST Divo	0	1	7	7	6	0	3	1	1	1	1	1	6	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
TS3 CO	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 CTP	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 TD	0	0	0	0	0	0	0	0	1	0	0	0	0	2	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	5	2	2	2	2	2	4	4	4	4	4	4	4	1	1
UST LCPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
UST LPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
UST PO1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
UST PO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	40
UST PO3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
UST PO4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
BFM	0	0	0	0	0	0	0	0	0	2	3	0	3	0	0	0	0	0	0	0	0	2	2	2	2	2	4	4	4	4	4	4	4	0	0
USNTD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	5
RS&C SME	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST MO	0	0	0	0	0	0	0	0	0	7	8	10	10	5	0	0	0	0	9	11	10	0	0	0	0	0	0	0	0	0	0	0	0	25	25

Resource	6/7/21	6/14/21	6/21/21	6/28/21	7/5/21	7/12/21	7/19/21	7/26/21	8/2/21	8/9/21	8/16/21	8/23/21	8/30/21	9/6/21	9/13/21	9/20/21	9/27/21	10/4/21	10/11/21	10/18/21	10/25/21	11/1/21	11/8/21	11/15/21	11/22/21	11/29/21	12/6/21	12/13/21	12/20/21	12/27/21	1/3/22	1/10/22	1/17/22	1/24/22
Week	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
PM	45	45	40	40	0	0	16	7	7	10	10	10	10	20	20	20	20	20	25	25	30	20	20	20	20	20	20	20	20	20	15	15	10	10
UST DH	3	5	1	1	2	2	0	0	0	0	0	0	0	5	5	20	20	5	5	6	4	0	0	0	0	0	0	0	0	0	2	0	0	3
UST OPS	40	40	40	40	0	0	10	0	0	10	10	10	10	0	0	20	20	5	5	6	24	20	20	20	0	20	20	10	10	20	10	10	0	0
UST Divo	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
TS3 CTP	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 TD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAS	1	1	1	1	2	2	11	7	7	10	10	10	10	0	0	20	20	0	0	0	10	10	10	10	0	10	10	0	10	10	10	10	0	0
UST LCPO	12	12	22	13	26	16	10	10	0	0	0	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST LPO	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST PO1	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	20	20	0	0	0	0	0	20	20	0	20	20	0	20	20	0	0	0	0
UST PO2	40	40	40	40	0	0	0	0	0	0	0	0	0	0	0	20	20	0	0	0	0	0	20	20	0	20	20	0	20	20	0	0	0	0
UST PO3	23	23	33	33	36	36	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST PO4	23	23	33	33	36	36	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USNTD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RS&C SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST MO	5	7	3	4	8	8	3	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 5: Resource Loading Summary (Labor)

Resource Loading by Week: Cost (hundreds of dollars)

Resource	10/5/20	10/12/20	10/19/20	10/26/20	11/2/20	11/9/20	11/16/20	11/23/20	11/30/20	12/7/20	12/14/20	12/21/20	12/28/20	1/4/21	1/11/21	1/18/21	1/25/21	2/1/21	2/8/21	2/15/21	2/22/21	3/1/21	3/8/21	3/15/21	3/22/21	3/29/21	4/5/21	4/12/21	4/19/21	4/26/21	5/3/21	5/10/21	5/17/21	5/24/21	5/31/21
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
PM	1.5	1.5	5	5	5	5	5	2.5	2.5	9.5	10.5	12.5	12.5	10	0	2.5	5	2.5	7.5	7.5	7.5	1	1	1	1	1	2	2	2	2	2	2	2	22.5	22.5
UST DH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST OPS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST Divo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 CTP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 TD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST LCPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST LPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16
UST PO1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16
UST PO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16
UST PO3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	1.2
UST PO4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.2	1.2
BFM	0	0	0	0	0	0	0	0	0	1	1.5	0	1.5	0	0	0	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	2	2	0	0
USNTD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RS&C SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST MO	0	0	0	0	0	0	0	0	0	3.5	4	5	5	2.5	0	0	0	0	4.5	5.5	5	0	0	0	0	0	0	0	0	0	0	0	0	12.5	12.5
Vendor Payments				0																															

Resource	6/7/21	6/14/21	6/21/21	6/28/21	7/5/21	7/12/21	7/19/21	7/26/21	8/2/21	8/9/21	8/16/21	8/23/21	8/30/21	9/6/21	9/13/21	9/20/21	9/27/21	10/4/21	10/11/21	10/18/21	10/25/21	11/1/21	11/8/21	11/15/21	11/22/21	11/29/21	12/6/21	12/13/21	12/20/21	12/27/21	1/3/22	1/10/22	1/17/22	1/24/22
Week	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69
PM	22.5	22.5	20	20	0	0	8	3.5	3.5	5	5	5	5	10	10	10	10	10	12.5	12.5	15	10	10	10	10	10	10	10	10	10	7.5	7.5	5	5
UST DH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST OPS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST Divo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 CTP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TS3 TD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST LCPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST LPO	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST PO1	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	8	8	0	0	0	0	0	8	8	0	8	8	0	8	8	0	0	0	0
UST PO2	16	16	16	16	0	0	0	0	0	0	0	0	0	0	0	8	8	0	0	0	0	0	8	8	0	8	8	0	8	8	0	0	0	0
UST PO3	9.2	9.2	13.2	13.2	14.4	14.4	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST PO4	9.2	9.2	13.2	13.2	14.4	14.4	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BFM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USNTD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
RS&C SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UST MO	2.5	3.5	1.5	2	4	4	1.5	1.5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vendor Payments				30,000																								10,000						

Figure 6: Resource Loading Summary (expenses)

10.0 RESPONSIBILITY MATRIX

A responsibility matrix identifying key stakeholders and their responsibilities at each activity is included in Table 5. To limit the scope of this analysis, responsibilities were only identified for the 23 activities delineated in the network schedule in Section 8, and 7 stakeholders to include the Project Manager (PM). While the majority of responsibility falls under the PM and UST DH, this table highlights many activities which require integration with outside entities.

Table 5: Responsibility Matrix

Act ID	WBS #	Activity(ies)	Pred	Key Stakeholders						
				TS3 CO	TS3 TECT	USNTD	PCSR	UST DH	PM	GAS
1	1.1	Requirements Generation					N	M	R	
2	1.2	Platform-Specific Initial CONOPS Development	1				N	M	R	
3	1.3	Initial Platform Financial and Multi-Criteria Analysis	2					M	R	
4	1.4	Command Project Review and Continuation Board	3	D				M	R	
5	2.1.1	Fine CONOPS Development	4			N	N	M	R	
6	2.1.2, 2.1.3	RFP Solicitation, Training/Acquisition Plan Development	4					M	R	R
7	2.1.4	Initial Scheduling	6					M	R	R
8	2.2.1, 2.2.2	MCDM Matrix Generation, Financial Model Generation	5, 7						R	
9	2.2.3	SME Ranking	8					R		
10	2.3.1	Squadron Leadership Briefing	9	D				M	R	

11	2.3.2	Senior Leadership Briefing	10	M		N	N	M	R	
12	2.3.3	Final Project Selection Decision	11	R		N	N			
13	2.4.1, 2.4.2, 2.4.3	Fine Training Plan, Acquisition Plan, and Integration Plan Development	12					M	R	
14	2.4.4	Updated Scheduling	13						R	
15	2.4.5	Contract Award	14	M				N	N	R
16	3.1.1, 3.1.2	Aircrew and Maintenance Training	15	N				M	R	
17	3.2.1	Airframe Delivery	15	N		R		M	R	
18	3.2.2	Airframe Maintenance	17					R		
19	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5	GCS, Simulator, GSE, Tools, and Sensor Delivery	15					N	N	R
20	3.4	Simulator Check-out	19						R	R
21	4.1	Platform Test Planning	15		N			M	R	
22	4.2.1	Subsystem Testing	19					M	R	
23	4.2.2	Airframe Ground Testing	21, 22	N	P			M	R	
R = directly responsible, M = managerial oversight, N = notification required, P=permission required, D=decision										

11.0 RISK MANAGEMENT

Several risks were identified in project planning: Organizational Support, Funding, Integration, and Contractor Performance. The definitions of what low, medium, and high probabilities of each of these risks imply, the probability of any of these risks materializing in this project given these definitions, and the overall project risk probability score are delineated in Table 6.

Table 6: Project Risk Probabilities

	Risk Probabilities			**Project Risk Probabilities (Po)**
	Low Probability (0.1)	Medium Probability (0.5)	High Probability (0.9)	
Organizational Support	Project is low-cost, short duration, and has been done before	Project is medium cost and duration, and something similar has been done before	Project is high-cost and long-term, and nothing similar has been done before.	0.8
Funding	Project is low-cost or medium-cost with assured Return on Investment (ROI)	Project is medium cost with probable ROI.	Project is high-cost with questionable ROI.	0.6
Integration	Integration is low-cost and simple, and has been performed at this unit previously.	Integration is medium cost and of moderate complexity, and has been performed on the same platform at a different location before.	Integration is high-cost and long-duration, and has not been performed on a similar platform.	0.5
Contractor Performance	Contractor involvement is low and/or organic skills exist to conduct activities.	Contractor involvement is moderate but project scope is limited and contractors have proven performance record.	Contractor is heavily involved and have not performed similar tasks before or are new to DoD contracting.	0.5
Overall Po				0.6

The three critical project areas and the definitions of low, medium, and high impacts to each critical area are listed in Table 7.

Table 7: Critical Project Areas

Impact Upon 3 Critical Areas			
	Low (0.1)	Medium (0.5)	High (0.9)
Cost	Budget exceeded <10%.	Budget exceeded >10% but <50%.	Budget exceeded >50%.
Schedule	Project duration exceeded less than 10%.	Project duration exceeded more than 10% and less than 50%.	Project duration exceeded more than 50%.
Performance	Platform can perform more than 70% of RS&C missions.	Platform can perform more than 50% of RS&C missions but less than 70%.	Platform can perform less than 50% of RS&C missions.

The impact score of each project risk on each project critical area is given in Table 8, as well as the total project impact score for each risk and the overall project risk impact score.

Table 8: Risk Impacts on Critical Areas

Project Level of Impact (Ri)				
	Organizational Support	Funding	Integration	Contractor Performance
Cost	0.30	0.90	0.50	0.70
Schedule	0.90	0.90	0.60	0.80
Performance	0.60	0.80	0.80	0.50
Total Project Impact	0.60	0.87	0.63	0.67
Total Project Risk Impact (Ri)	0.69			

The overall project risk factor is calculated in Table 9, using the methodology provided in reference 2.

Table 9: Overall Project Risk Factor

Overall Project Risk Factor	
Overall Probability of Occurrence	0.60
Overall Risk Impact	0.69
Overall Project Risk Factor	**0.88**

In the interest of mitigating risk, Table 10 depicts each project risk in order of severity, as well as one or more risk indicators that can be monitored to assess the likelihood of a risk materializing.

Table 10: Project Risk Indicators

Severity Rank	**Risk**	**Risk Indicators**
1	Funding	Limited support from higher authority. Limited customer interest / commitment.
2	Contractor Performance	Poor GAS past performance reviews. Contractor does not have detailed plan.
3	Organizational Support	Leadership does not push forward with requests proactively.
4	Integration	Power or size requirements are not explicitly acceptable.

12.0 CRITICAL KNOWLEDGES

Several critical knowledges have been identified which will be necessary for this project and are depicted in Table 11.

Table 11: Critical Knowledges

Critical Knowledge	Why is this knowledge critical?	Critical Knowledge Source	Knowledge Transfer/Creation Method
MQ-1B Technical Performance	MQ-1B technical performance knowledge will be required in many stages of the project, from initial concept development and the project proposal, up to test planning, analysis of test results, and test reporting. Early on, MQ-1B technical knowledge will be used to inform the feasibility of use of the MQ-1B platform for RS&C events, including its range, line of sight constraints, data throughput capabilities, and manning requirements.	MQ-1 Flight Manuals, TO 1Q-1(M)B-1 and series	This knowledge will be gained through reading the MQ-1B manuals, aircrew and maintenance training at GAS facilities, and Computer-Based Trainings (CBTs) acquired from the U.S. Air Force (USAF).
PCSR RS&C Requirements	The PCSR RS&C requirements will be critical knowledge as early as project initiation, as it will be necessary to understand what the Range needs in terms of surveillance and clearance in order to pick a platform to provide that capability. In addition to knowing the PCSR requirements for the amount of airspace and sea space to be cleared, it should also be known whether visual clearance or radar-only clearance is required and when, what data links the range must have with the aircraft performing RS&C, and what additional "nice to have" capabilities are that can be integrated on to UAS platforms.	PCSR User's Guide Range Test Manager RS&C SMEs	This knowledge will be transferred through reading the Range User's Manuals and conversations with PCSR Test Managers and leadership. Knowledge that is not resident, including specifics pertaining to UAS RS&C requirements, must be created through dialogue between NAWC and PCSR leadership.

FAA / DoD UAS Regulations	These regulations can affect the UAS when operating outside restricted airspace. If the UAS is not able to operate outside restricted airspace due to regulations, its capability to conduct useful RS&C will be significanlty degraded. A thorough understanding of Federal Aviation Administration (FAA) and DoD UAS regulations and knowledge of the procedures and requirements to ceritfy the UAS to operate outside restricted areas will be required to maximize RS&C performance and will smooth UAS operations from the airfield.	USN FAA Representative Existing TS3 Knowledge CNAF M-3710.7 Federal Aviation Regulations	While some of this knowledge exists in TS3 and PCSR UAS SMEs, other knowledge will be required to be gained through the USN FAA representative and guidance in Federal Aviation Regulations (FAR). Any ambiguous wording in regulations will have to be interpreted by the FAA and DoD policymakers to ensure safe and legal UAS operations.
APS-1 Technical Specifications	Technical specifications of the APS-1 Surface Search Radar will be required to meet PCSR RS&C requirements and also to correctly integrate the APS-1 into the MQ-1B. Because the APS-1 has never been integrated into the MQ-1, questions such as power requirements, size and weight, data throughput, and link requirements must be answered before integration commences.	APS-1 Vendor Experts APS-1 Technical Documentation GAS Integration Team	The majority of this knowledge must be transferred from APS-1 vendor experts and engineers and through the APS-1 technical documentation. Some knowledge will likely be acquired as the APS-1 is integrated by the GAS team, and this knowledge should be passed on to both the APS-1 vendor as well as TS3 personnel to streamline future integration efforts.
MTS-B Technical Specifications	Technical specifications of the MTS-B EO/IR sensor will be required to meet PCSR RS&C requirements and also to correctly integrate the MTS-B into the MQ-1B. Because the MTS-B has been previously integrated onto the MQ-1B, power requirements, size and weight, data throughput, and link requirements should be well known but must be transferred to TS3 technicians and aircrew.	GAS Technical Experts MTS-B Technical Documentation	This knowledge must be transferred from GAS experts and engineers and through GAS technical documentation.

13.0 COMMUNICATION MANAGEMENT

The Key Communications in Table 12 identify five critical communications in the project and denote important information regarding each.

Table 12: Key Communications

ID/Title of Communication Action	Sources	Recipient	Purpose	Information / Data	Frequency	Channels	Channel Noise / Reduction	Feedback Required
Continuation Board	PM UST DH	TS3 CO, CTP, and TD	Update leadership on project progress and solicit leadership decision whether to continue project with more in-depth analysis.	Possible Platforms CONOPS Anticipated Budget, Schedule, and Performance	One-time, WBS 1.4	In-person or via Telecon	In person - noise in the room, unclear speaking. Telecon - slow/intermittent connection. Mitigation: Ask over telecon to make sure everyone heard. Open up for questions. Speak clearly and precisely.	Command decision whether or not to continue project and how to allocate further resources.
RFP Solicitation	TS3, BFM	GAS and other vendors	Request proposals from vendors to provide UAS GCS, simulator, sensor, and GSE materials and to provide integration, training, and testing services.	Items Required Services Required Timeline Desired Intentions for Use	One-time, WBS 2.1.2	Vendor message through government contracting channels	Noise: Miscommunication between BFM and TS3 on requirements, unclear terms or excessive legal language due to format, excessively broad/narrow scope due to government regulation. Mitigations: Review RFP with BFM prior	Proposals from vendors to provide requested services and equipment.

							to sending, make wording as clear and unambiguous as possible.	
Senior Leadership Briefing	TS3 CO, UST DH, PM, PCSR	NAWC Commodore or Admirals, Senior PCSR Leadership	Update senior leadership on project progress. Make formal request to senior leadership to proceed with contracting effort and UAS acquisition for RS&C. Await senior leadership decision.	Platform identified, Budget, CONOPS, Schedule, Performance, customer feedback	One-time, WBS 2.3.2	In person or via telecon.	In person - noise in the room, unclear speaking. Telecon - slow/intermittent connection. Mitigation: Ask over telecon to make sure everyone heard. Open up for questions. Speak clearly and precisely.	Senior leadership decision whether or not to continue project and how to allocate further resources, decision on contracting.
Contract Award	GAS or other vendor	BFM	Inform contractor of contract award and finalize terms of the contract.	Cost, schedule, equipment and services required, nature of testing and scope of contractor services.	One-time, WBS 2.4.5	Vendor message through government contracting channels	Noise: Miscommunication between BFM and TS3 on requirements, unclear terms or excessive legal language due to format, excessively broad/narrow scope. Mitigations: Review RFP with BFM prior to sending, make wording as clear and unambiguous as possible, ensure full scope of contractor duties are carefully delineated.	BFM notification, contractor contact and timeline for delivery of equipment and services.

Weekly Update Meeting	PM	UST DH, UST OPS, UST MO, UST Divo, UST LCPO, other entities as required to include TS3 CO/CTP/TD, USNTD and PCSR representatives.	Inform all parties on status of the project, set goals for the next week, outline any issues, update cost, schedule, and performance, identify any issues and brainstorm fixes.	Project Status Budget versus Baseline Integration Status Issues Encountered Next Steps Goals	Weekly	In person or via telecon.	In person - noise in the room, unclear speaking. Telecon - slow/intermittent connection. Mitigation: Ask over telecon to make sure everyone heard. Open up for questions. Speak clearly and precisely. Less formal environment so personnel should comfortable speaking up.	Fixes for issues encountered. Feedback on goals. Plans for next week.

14.0 PROJECT BUDGET

The overall project budget is depicted in Table 13. Payments to the general contractor, GAS, are by far the greatest expense. Because GAS is providing all necessary equipment per their contract and airframes are being delivered from USNTD free of charge, the remaining costs are manning resources only. The total project budget from initiation to the first RS&C test flight and published test reports is $5,151,875.

Table 13: Budget

Total Budget	
Resource	**Cost**
PM	$63,688
UST DH	$0
UST OPS	$0
UST Divo	$0
TS3 CO	$0
TS3 CTP	$0
TS3 TD	$0
GAS	$0
UST LCPO	$0
UST LPO	$12,000
UST PO1	$20,000
UST PO2	$20,000
UST PO3	$11,500
UST PO4	$11,500
BFM	$2,875
USNTD	$0
RS&C SME	$0
UST MO	$10,313
GAS Payments	$5,000,000
Total	**$5,151,875**

The project budget was calculated using the $4M contract with GAS as specified in the SOW, manning resource costs depicted in Table 14, and 25% overhead for all expenses.

Table 14: Costs and Overhead

Price per resource per hour			
Resource	Cost	Overhead	Total Cost
PM	$50	25%	$63
UST DH	$0	25%	$0
UST OPS	$0	25%	$0
UST Divo	$0	25%	$0
TS3 CO	$0	25%	$0
TS3 CTP	$0	25%	$0
TS3 TD	$0	25%	$0
GAS	$0	25%	$0
UST LCPO	$0	25%	$0
UST LPO	$40	25%	$50
UST PO1	$40	25%	$50
UST PO2	$40	25%	$50
UST PO3	$40	25%	$50
UST PO4	$40	25%	$50
BFM	$50	25%	$63
USNTD	$0	25%	$0
RS&C SME	$0	25%	$0
UST MO	$50	25%	$63
Vendor Payments	$4,000,000	25%	$5,000,000

A time-phased budget summary follows in Figure 7 and Figure 8. Besides the large payments to GAS at weeks 41 and 65, other large expenditures occur in phases where flights or maintenance is required, necessitating considerable numbers of aircrew and maintenance personnel. A full Time-Phased Budget based off the Resource Loading Chart is available in Appendix B, Figure B-7 through Figure B-12.

		Budget by Week: Cost (hundreds of dollars)																																			
		10/5/20	10/12/20	10/19/20	10/26/20	11/2/20	11/9/20	11/16/20	11/23/20	11/30/20	12/7/20	12/14/20	12/21/20	12/28/20	1/4/21	1/11/21	1/18/21	1/25/21	2/1/21	2/8/21	2/15/21	2/22/21	3/1/21	3/8/21	3/15/21	3/22/21	3/29/21	4/5/21	4/12/21	4/19/21	4/26/21	5/3/21	5/10/21	5/17/21	5/24/21	5/31/21	6/7/21
Resource	**Week**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
	PM	2	2	6	6	6	6	6	3	3	12	13	16	16	13	0	3	6	3	9	9	9	1	1	1	1	1	3	3	3	3	3	3	3	28	28	28
	UST DH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST OPS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST Divo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TS3 CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TS3 CTP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TS3 TD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST LCPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST LPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20	20
	UST PO1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20	20
	UST PO2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	20	20
	UST PO3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	12
	UST PO4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	12
	BFM	0	0	0	0	0	0	0	0	0	1	2	0	2	0	0	0	0	0	0	0	0	1	1	1	1	1	3	3	3	3	3	3	3	0	0	0
	USNTD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RS&C SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST MO	0	0	0	0	0	0	0	0	0	4	5	6	6	3	0	0	0	0	6	7	6	0	0	0	0	0	0	0	0	0	0	0	0	16	16	3
	Funds	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	**2**	**2**	**6**	**6**	**6**	**6**	**6**	**3**	**3**	**18**	**20**	**22**	**24**	**16**	**0**	**3**	**6**	**3**	**15**	**16**	**16**	**3**	**3**	**3**	**3**	**3**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**107**	**107**	**114**

Figure 7: Time-Phased Budget Summary by Week (1 of 2)

		Budget by Week: Cost (hundreds of dollars)																																
		6/14/21	6/21/21	6/28/21	7/5/21	7/12/21	7/19/21	7/26/21	8/2/21	8/9/21	8/16/21	8/23/21	8/30/21	9/6/21	9/13/21	9/20/21	9/27/21	10/4/21	10/11/21	10/18/21	10/25/21	11/1/21	11/8/21	11/15/21	11/22/21	11/29/21	12/6/21	12/13/21	12/20/21	12/27/21	1/3/22	1/10/22	1/17/22	1/24/22
Resource	**Week**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**	**51**	**52**	**53**	**54**	**55**	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**
	PM	28	25	25	0	0	10	4	4	6	6	6	6	13	13	13	13	13	16	16	19	13	13	13	13	13	13	13	13	13	9	9	6	6
	UST DH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST OPS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST Divo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TS3 CO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TS3 CTP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TS3 TD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GAS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST LCPO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST LPO	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST PO1	20	20	20	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	10	10	0	10	10	0	10	10	0	0	0	0
	UST PO2	20	20	20	0	0	0	0	0	0	0	0	0	0	0	10	10	0	0	0	0	0	10	10	0	10	10	0	10	10	0	0	0	0
	UST PO3	12	17	17	18	18	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST PO4	12	17	17	18	18	10	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BFM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	USNTD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RS&C SME	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UST MO	4	2	3	5	5	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Funds	0	0	0	0	37500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12500	0	0	0	0
	Total	**116**	**120**	**121**	**41**	**37541**	**32**	**26**	**7**	**6**	**6**	**6**	**6**	**13**	**13**	**33**	**33**	**13**	**16**	**16**	**19**	**13**	**33**	**33**	**13**	**33**	**33**	**13**	**33**	**12533**	**9**	**9**	**6**	**6**

Figure 8: Time-Phased Budget Summary by Week (2 of 2)

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ACRONYMS AND ABBREVIATIONS

AHP ..... Analytic Hierarchy Process

AoA..... Analysis of Alternatives

CO ..... Commanding Officer

CONOPS ..... Concept of Operations

CTP ..... Chief Test Pilot

DH ..... Department Head

DOD..... Department of Defense

GCS..... Ground Control Station

IOC ..... Initial Operational Capability

KCAS..... Knots Calibrated Airspeed

LOS ..... Line of Sight

MCDM ..... Multi-Criteria Decision Making

MTS..... Multi-Spectral Targeting System

NAWC..... Naval Air Warfare Center

O&S..... Operations and Support

PAI..... Primary Aircraft Inventory

PCSR..... Pacific Coast Sea Range

RDT&E ..... Research, Development, Test and Evaluation

RS&C..... Range Surveillance and Clearance

SME..... Subject Matter Expert

T/M/S ..... Type Model Series

T/M/S ..... Type/Model/Series

TD..... Technical Director

UAS ..... Unmanned Aircraft System

UST ..... Unmanned Systems Test

WBS ..... Work Breakdown Structure

APPENDIX A: PROJECT JOURNAL

Event 1: Problem Definition, 7/15/2020

In this event, I explored the possible projects available and the method for their conduct. While the UAS acquisition project was too large in scope to actually conduct within the allotted time frame, I felt that it was fitting to perform given my professional interests, level of expertise in the subject, and desire to conduct a similar project in the future. Upon selecting UAS Acquisition for the RS&C mission as my project, I had to define the scope of the problem. I selected a full replacement of existing RS&C assets that would occur over 2 years and have a lifetime of 10 years. I also ensured that TS3 had the option to retain existing RS&C assets or move to a mixed utilization pattern if doing so was found to be more advantageous from a financial or capabilities-based perspective.

Event 2: Initial Rough Order of Magnitude (ROM) Estimates, 7/16/2020

In order to satisfy the course requirement and my own need to know, I initiated a process to find the estimated cost of the project over its life. This involved rough estimates of labor, maintenance, operations, integration, training, and support costs, as well as the costs of initial system acquisition. I completed ROM estimates for the four projects that would later be considered in Project Selection: retaining the existing P-3C assets, acquiring MQ-9 assets, acquiring MQ-1 assets, and supplementing RS&C with RQ-23 assets. These estimates led to an expected initial cost ranging from zero to $1.5M and lifetime costs (including all Operations and Support, methodology defined in reference 1) of $250 to $350M over 12 years.

Event 3: CONOPS Development, 7/25/2020

To develop the CONOPS for each platform, I had to research the amount of space each platform could cover in a given amount of time, its ability to carry payloads such as EO/IR sensors and radars, its data link throughput and maximum range capabilities, and its endurance. For many of these I might have been able to access official information, but used freely available information from Wikipedia for the contents of the project. Given the performance characteristics of each platform, I was able to determine whether each platform could perform the RS&C mission, and if so, how well.

Event 4: Project Selection, 7/25/2020

I selected the MQ-1B as the platform that was notionally selected by the squadron and leadership during project selection. Because the process could vary significantly depending on the platform selected, selecting a platform myself enabled more definitive capabilities and budget discussions, rather than going into multiple different answers for each platform or conducting excessively vague project planning. The MQ-1B was found to provide reasonable supplementary RS&C capabilities at a reasonable cost, with potential for future customers and payloads on project test flights.

Event 5: SOW Definition, 8/8/2020

In developing the SOW, I leveraged the course guidance as well as industry guidance on the contents of the SOW. It was challenging to make the SOW concise as required per the course guidelines, but also address all the necessary facets of an SOW. In creating the SOW I also notionally selected a contractor, GAS, to provide a variety of services pertaining to the project. I could have written an SOW for the squadron

providing an RS&C asset to the PCSR, but the SOW with GAS was a more realistic option and allowed detailed planning of the contract.

Event 6: Basic Assumptions Delineation, 8/14/2020

When defining the basic assumptions, I used a combination of realistic assumptions as well as unrealistic assumptions to ensure that the project remained within scope and was manageable. One of the overarching themes of the assumptions was that all phases of the project were to occur nominally, with minimal budget or cost issues that would change the products or cost, schedule, or performance. Of course, these are assumptions that are made at the outset of any project, and as the project progresses the project team must adapt or change the cost, schedule, or performance accordingly.

Event 7: Strategic Importance Research, 8/14/2020

In researching the strategic importance of this project, I was able to leverage my own expertise as a SME in this area, as well as the expertise of others currently in similar positions. I focused both on long-term DoD strategy as well as medium-term squadron strategy, as most work is occurring at the squadron level, however it is in the best interest of the country to consider DoD priorities rather than sub-optimizing at the squadron level. Just like projects, DoD programs run on cost, schedule, and performance, so my strategic importance of the UAS RS&C project relied on its ability to maintain or improve DoD capabilities at lower cost, enabling maintenance of cost, schedule, and performance for major DoD programs.

Event 8: Technical Specifications Research, 8/14/2020

In the interest of using information only available in the public realm and limiting exposure to DoD programs, I used information from Wikipedia for the capabilities of the

P-3C Orion and MQ-1B Predator. I only listed the specifications of these platforms, as the other platforms would be notionally not chosen at project selection. I selected only parameters which pertained to the cost or performance of the asset, either directly (radar clearance capability) or indirectly (costs of manning or fuel). As little information was available from non-official sources regarding the MTS-B EO/IR sensor, I used notional figures comparable to off-the-shelf sensors. Though the APS-1 radar is only notional, I inserted specifications for it as well in the interest of directly comparing P-3C and MQ-1B RS&C capabilities with these sensors installed.

Event 9: WBS Creation, 8/16/2020

The first four events of the WBS had previously been completed at the Project Proposal, so I continued from there. I followed a realistic progression of events, but did not break it down into every single meeting in order to limit the scope (as it was, I came out with more events than the 20+/-3 desired for the Project Management deliverable). The longest and most detailed phase was Project Selection, probably a realistic reflection given the amount of time that must go into detailed planning and contract development. Though resources would not be fully loaded for each event, I anticipated other unit priorities during the project so gave realistic timelines for each event to be completed. In some cases, higher-level activities had no sub-activities (i.e., simulator check-out, 3.4), so they were left at the higher level, but treated as a lowest-level activity. To properly organize the WBS with dates that took into account precedence of each activity, I used Project Libre to generate dates. Then, I used those dates to develop a Gantt chartin MS Excel in the next Event.

Event 10: Gantt Chart Creation, 8/16/2020

Though the WBS I created in Project Libre developed a Gantt chart, it was difficult to follow and could not easily be printed or displayed. As a result, I built a new WBS in MS Excel, from which I was able to build a Gantt chart with the help of internet tutorials. I used different colors for different WBS phases of the project, with lighter colors corresponding to overarching events while darker colors represented individual activities (or higher-level activities with no offspring). The Gantt chart clearly shows separate phases of the project, and makes longer tasks such as contract award and acquisition stand out. The downside of the Gantt chart I used was that it does not show resource loading or precedence, but resource loading in this project might be too complicated to depict on a Gantt chart, and the PERT chart depicts predecessors.

Event 11: PERT Chart Development, 8/16/2020

In limiting the scope of the project to 20 +/- 3 activities, I took the events from the WBS and Gantt chart and combined several that shared identical start and end dates and predecessors. I was still limited to only depicting up to event 4.2.2, but this accounted for the majority of the project. In constructing the PERT analysis chart, I compared my initial estimates to more detailed estimates acquired by using the optimistic, most likely, and pessimistic estimates, then averaging them with Simpson's Rule. My initial deadline was to complete event 4.2.2 by 230 days into the project, while the new estimates gave 221 days. From there, I calculated the standard deviation and variance for the critical path using the methodology presented in reference 2, resulting in a reasonable 73.3% chance of completion on time. For the PERT chart itself, I used Excel drawing tools and summing functions to connect interrelated activities. The first

half of the PERT chart is relatively straightforward, but several events branched off after contract award, forcing me to perform detailed analysis of the latest possible completion dates for the non-critical path.

Event 12: Resource Loading and Initial Budget, 8/19/2020

Developing the resource loading chart required knowledge of the expected amount of labor for each resource. I conducted the cost analysis simultaneously and costs without overhead can be found on the resource loading chart. Because of the large size of the project, I was not able to easily fit the resource loading chart into the document, so I included only summaries by week, with the full resource loading chart spread over five pages in Appendix B. I leveled resources where able, but did not make any attempts to assign an alternate PM while the PM was away at training, instead opting for the PM to conduct those activities in his/her off time.

Event 13: Responsibility Matrix Definition, 8/20/2020

The responsibility matrix required knowledge of what personnel were required for what activities, and was only conducted for the first 23 activities. I initially included more in-house squadron and department personnel, but changed the chart to incorporate more inorganic personnel to be more informative and better show where outside coordination was required. Even then, the majority of tasks rested on the PM and UST DH. My own knowledge of these processes enabled relatively straightforward development of this matrix.

Event 14: Risk Analysis, 8/22/2020

In developing the Risk Analysis framework, I had to define the four most relevant risks. I opted more general risks (i.e., funding) rather than very specific ones. For the critical

project areas, I focused on the three general DoD Program Management areas – Cost, Schedule, and Performance. Though I had some trouble defining performance, I concluded that a simple percentage of RS&C missions that could be performed by the platform (in a supplementary or unilateral capacity) was a fitting definition. The overall project risk factor was quite high (0.88), and will have to be addressed in the future if this project is to be performed.

Event 15: Critical Knowledges and Communications, 8/22/2020

For critical knowledges, I used the most important metrics of the project, and the ones that the squadron and PCSR would be most concerned with. Most knowledge could be transferred, though some also had to be created (UAS integration into RS&C, for instance). In communications, I focused primarily on large consequential meetings and documents, though also included the weekly update meeting. Developing this required my own knowledge as well as updated information on Range and squadron procedures and contracting methods.

Event 16: Final Project Budget, 8/22/2020

Developing the final project budget was relatively simple, as the majority of work was completed in the resource loading chart. Completion of the final project budget included revisiting costs for labor, adding overhead, and then aggregating costs in new charts. The final budget came out to $5,151,875, the vast majority of which (>95%) is the ROM estimate for the contract with GAS. In the future, decision-makers should look to this contract as the primary method of reducing cost.

Event 17: Project Journal Completion, 8/23/2020

Completing the project journal simply involved editing the sections previously completed for clarity and writing sections 17 and 18. I also updated previous sections where I made changes to the project over the course of its completion.

Event 18: Project Completion, 8/23/2020

In closing out the project, I reviewed the list of project deliverables against my project report, and fixed formatting issues where they appeared. Tables and charts were re-organized where able for readability, though some remained stubbornly small. The Appendices and Table of Contents were updated and a quick read-through completed.

APPENDIX B: TABLES AND FIGURES

(Continued on next page)

Act ID	WBS #	Activity(ies)	Predecessor	Opt	Most Likely	Pess	Estimate	CP Std Dev	CP Var
1	1.1	Requirements Generation		5	8	15	9	1.67	2.78
2	1.2	Platform-Specific Initial CONOPS Development	1	10	15	30	17	3.33	11.11
3	1.3	Initial Platform Financial and Multi-Criteria Analysis	2	5	10	15	10	1.67	2.78
4	1.4	Command Project Review and Continuation Board	3	3	5	10	6	1.17	1.36
5	2.1.1	Fine CONOPS Development	4	10	15	25	16		
6	2.1.2, 2.1.3	RFP Solicitation, Training/Acquisition Plan Development	4	10	15	20	15	1.67	2.78
7	2.1.4	Initial Scheduling	6	2	4	10	5	1.33	1.78
8	2.2.1, 2.2.2	MCDM Matrix Generation, Financial Model Generation	5, 7	5	10	15	10	1.67	2.78
9	2.2.3	SME Ranking	8	0.5	1	1.5	1	0.17	0.03
10	2.3.1	Squadron Leadership Briefing	9	3	5	10	6	1.17	1.36
11	2.3.2	Senior Leadership Briefing	10	5	10	20	11	2.50	6.25
12	2.3.3	Final Project Selection Decision	11	10	20	40	22	5.00	25.00
13	2.4.1, 2.4.2, 2.4.3	Fine Training Plan, Acquisition Plan, and Integration Plan Development	12	5	10	20	11	2.50	6.25
14	2.4.4	Updated Scheduling	13	3	5	10	6	1.17	1.36
15	2.4.5	Contract Award	14	20	40	80	44	10.00	100.00
16	3.1.1, 3.1.2	Aircrew and Maintenance Training	15	30	30	30	30		
17	3.2.1	Airframe Delivery	15	5	15	30	16		
18	3.2.2	Airframe Maintenance	17	10	30	60	32		
19	3.3.1, 3.3.2, 3.3.3, 3.3.4, 3.3.5	GCS, Simulator, GSE, Tools, and Sensor Delivery	15	10	20	40	22	5.00	25.00
20	3.4	Simulator Check-out	19	5	10	15	10		
21	4.1	Platform Test Planning	15	10	15	30	17		
22	4.2.1	Subsystem Testing	19	3	10	20	11	2.83	8.03
23	4.2.2	Airframe Ground Testing	21, 22	5	15	25	15	3.33	11.11

Critical Path Variance	209.75
Critical Path Std. Dev.	14.48

Deadline	230
Critical Path Estimate	221
Z-Score	0.621

Probability of Meeting Deadline	**0.733**

Figure B-1: PERT Network Analysis Chart

Resource Loading Chart

									10/5/20	10/11/20	10/12/20	10/18/20	10/19/20	10/25/20	10/26/20	11/1/20	11/2/20	11/8/20	11/9/20	11/15/20	11/16/20	11/22/20	11/23/20	11/29/20	11/30/20	12/6/20	12/7/20	12/13/20	12/14/20	12/20/20	12/21/20	12/27/20	12/28/20	1/3/21	1/4/21	1/10/21	1/11/21	1/17/21
									Week 1		Week 2		Week 3		Week 4		Week 5		Week 6		Week 7		Week 8		Week 9		Week 10		Week 11		Week 12		Week 13		Week 14		Week 15	
WBS ID	Activity Name	Start Date	End Date	Resources Needed	Total Time	Units	Cost	Cost Unit	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost
1.1	Requirements Generation	10/5/20	10/16/20	PM	6	hrs	50	$/hr	3	$150	3	$150																										
				UST DH	1	hrs	0	$/hr	0	$0	1	$0																										
				RS&C SME	1	hrs	60	$/hr	0	$0	1	$60																										
				UST OPS	1	hrs	0	$/hr	0	$0	1	$0																										
				UST Divo	1	hrs	0	$/hr	0	$0	1	$0																										
1.2	Platform-Specific Initial CONOPS Development	10/19/20	11/6/20	PM	30	hrs	50	$/hr					10	$500	10	$500	10	$500																				
				UST DH	20	hrs	0	$/hr					7	$0	7	$0	6	$0																				
				UST OPS	20	hrs	0	$/hr					7	$0	7	$0	6	$0																				
				UST Divo	20	hrs	0	$/hr					7	$0	7	$0	6	$0																				
1.3	Initial Platform Financial and Multi-Criteria Analysis	11/9/20	11/20/20	PM	20	hrs	50	$/hr											10	$500	10	$500																
				UST DH	3	hrs	0	$/hr											0	$0	3	$0																
				UST OPS	3	hrs	0	$/hr											0	$0	3	$0																
				UST Divo	3	hrs	0	$/hr											0	$0	3	$0																
1.4	Command Project Review and Continuation Board	11/23/20	12/4/20	TS3 CO	1	hrs	0	$/hr															0	$0	1	$0												
				UST DH	3	hrs	0	$/hr															2	$0	1	$0												
				PM	10	hrs	50	$/hr															5	$250	5	$250												
				TS3 CTP	1	hrs	0	$/hr															0	$0	1	$0												
				TS3 TD	1	hrs	0	$/hr															0	$0	1	$0												
				UST OPS	2	hrs	0	$/hr															1	$0	1	$0												
				UST Divo	2	hrs	0	$/hr															1	$0	1	$0												
2.1.1	Fine CONOPS Development	12/7/20	12/25/20	UST DH	3	hrs	0	$/hr																			1	$0	1	$0	1	$0						
				PM	15	hrs	50	$/hr																			5	$250	5	$250	5	$250						
				UST OPS	3	hrs	0	$/hr																			1	$0	1	$0	1	$0						
				UST Divo	3	hrs	0	$/hr																			1	$0	1	$0	1	$0						
2.1.2	RFP Solicitation	12/7/20	12/18/20	BFM	5	hrs	50	$/hr																			2	$100	3	$150								
				PM	15	hrs	50	$/hr																			7	$350	8	$400								
				UST MO	5	hrs	50	$/hr																			2	$100	3	$150								
2.1.3	Training/Acquisition Plan Development	12/7/20	12/18/20	UST DH	10	hrs	0	$/hr																			5	$0	5	$0								
				PM	15	hrs	50	$/hr																			7	$350	8	$400								
				UST OPS	10	hrs	0	$/hr																			5	$0	5	$0								
				UST MO	10	hrs	50	$/hr																			5	$250	5	$250								
2.1.4	Initial Scheduling	12/21/20	12/25/20	UST DH	2	hrs	0	$/hr																							2	$0						
				PM	20	hrs	50	$/hr																							20	$1,000						
				UST MO	10	hrs	50	$/hr																							10	$500						
2.2.1	MCDM Matrix Generation	12/28/20	12/31/20	PM	10	hrs	50	$/hr																									10	$500				
				UST DH	3	hrs	0	$/hr																									3	$0				
				UST MO	3	hrs	50	$/hr																									3	$150				
				UST OPS	3	hrs	0	$/hr																									3	$0				
				UST Divo	3	hrs	0	$/hr																									3	$0				
2.2.2	Financial Model Generation	12/28/20	12/31/20	PM	10	hrs	50	$/hr																									10	$500				
				UST DH	2	hrs	0	$/hr																									2	$0				
				UST MO	4	hrs	50	$/hr																									4	$200				
				BFM	3	hrs	50	$/hr																									3	$150				
2.2.3	SME Ranking	1/1/21	1/1/21	UST DH	3	hrs	0	$/hr																									3	$0				
				PM	5	hrs	50	$/hr																									5	$250				
				UST MO	3	hrs	50	$/hr																									3	$150				
				UST OPS	3	hrs	0	$/hr																									3	$0				
				UST Divo	3	hrs	0	$/hr																									3	$0				
2.3.1	Squadron Leadership Briefing	1/4/21	1/8/21	TS3 CO	2	hrs	0	$/hr																											2	$0		
				UST DH	5	hrs	0	$/hr																											5	$0		
				PM	20	hrs	50	$/hr																											20	$1,000		
				TS3 CTP	2	hrs	0	$/hr																											2	$0		
				TS3 TD	2	hrs	0	$/hr																											2	$0		
				UST MO	5	hrs	50	$/hr																											5	$250		
				UST OPS	5	hrs	0	$/hr																											5	$0		
				UST Divo	5	hrs	0	$/hr																											5	$0		
2.3.2	Senior Leadership Briefing	1/11/21	1/15/21	TS3 CO	2	hrs	0	$/hr																													2	$0
				TS3 CTP	2	hrs	0	$/hr																													2	$0
				TS3 TD	2	hrs	0	$/hr																													2	$0
				UST DH	5	hrs	0	$/hr																													5	$0
				UST PM	15	hrs	50	$/hr																													15	$750
				NAWC Commodore	1	hrs	0	$/hr																													1	$0

Figure B-2: Resource Loading Chart (1 of 5)

Resource Loading Chart

WBS ID	Activity Name	Start Date	End Date	Resources Needed	Total Time	Units	Cost	Cost Unit	1/18/21		1/24/21		1/25/21		1/31/21		2/1/21		2/7/21		2/8/21		2/14/21		2/15/21		2/21/21		2/22/21		2/28/21		3/1/21		3/7/21		3/8/21		3/14/21		3/15/21		3/21/21		3/22/21		3/28/21		3/29/21		4/4/21		4/5/21		4/11/21		4/12/21		4/18/21		4/19/21		4/25/21		4/26/21		5/2/21		5/3/21	
									Week 16				Week 17				Week 18				Week 19				Week 20				Week 21				Week 22				Week 23				Week 24				Week 25				Week 26				Week 27				Week 28				Week 29				Week 30			
									Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time
2.3.3	Final Project Selection Decision	1/18/21	2/5/21	TS3 CO	2	hrs	0	$/hr	0	$0	1	$0	1	$0																																																										
				TS3 CTP	2	hrs	0	$/hr	0	$0	1	$0	1	$0																																																										
				TS3 TD	2	hrs	0	$/hr	0	$0	1	$0	1	$0																																																										
				UST DH	4	hrs	0	$/hr	1	$0	1	$0	2	$0																																																										
				PM	20	hrs	50	$/hr	5	$250	10	$500	5	$250																																																									
2.4.1	Fine Training Plan Development	2/8/21	2/19/21	UST DH	2	hrs	0	$/hr													1	$0	1	$0																																																	
				PM	10	hrs	50	$/hr													5	$250	5	$250																																																			
				UST MO	10	hrs	50	$/hr													5	$250	5	$250																																																			
				UST OPS	10	hrs	0	$/hr													5	$0	5	$0																																																		
				UST LCPO	10	hrs	0	$/hr													5	$0	5	$0																																																	
2.4.2	Fine Acquisition Plan Development	2/8/21	2/19/21	UST DH	4	hrs	0	$/hr													2	$0	2	$0																																															
				PM	10	hrs	50	$/hr													5	$250	5	$250																																															
				UST MO	5	hrs	50	$/hr													2	$100	3	$150																																													
2.4.3	Fine Integration Plan Development	2/8/21	2/19/21	UST DH	2	hrs	0	$/hr													1	$0	1	$0																																													
				PM	10	hrs	50	$/hr													5	$250	5	$250																																															
				UST MO	5	hrs	50	$/hr													2	$100	3	$150																																													
				GAS	5	hrs	0	$/hr													2	$0	3	$0																																													
2.4.4	Updated Scheduling	2/22/21	2/26/21	PM	15	hrs	50	$/hr																					15	$750																																								
				UST MO	10	hrs	50	$/hr																					10	$500																																						
				GAS	5	hrs	0	$/hr																					5	$0																																						
2.4.5	Contract Award	3/1/21	5/21/21	UST DH	12	hrs	0	$/hr																							1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1
				PM	40	hrs	50	$/hr																							2	$100	2	$100	2	$100	2	$100	2	$100	2	$100	2	$100	2	$100	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4
				BFM	40	hrs	50	$/hr																							2	$100	2	$100	2	$100	2	$100	2	$100	2	$100	2	$100	2	$100	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4	$200	4
				GAS	40	hrs	0	$/hr																							2	$0	2	$0	2	$0	2	$0	2	$0	2	$0	2	$0	2	$0	4	$0	4	$0	4	$0	4	$0	4	$0	4	$0	4	$0	4	$0	4	$0	4
3.1.1	Aircrew Training	5/24/21	7/2/21	UST OPS	240	hrs	0	$/hr																																																																
				UST Divo	240	hrs	0	$/hr																																																													
				PM	240	hrs	50	$/hr																																																													
3.1.2	Maintenance Training	5/24/21	7/2/21	UST LPO	240	hrs	0	$/hr																																																													
				UST PO1	240	hrs	40	$/hr																																																												
				UST PO2	240	hrs	40	$/hr																																																												
3.2.1	Airframe Delivery	5/24/21	6/4/21	USNTD	10	hrs	0	$/hr																																																												
				UST MO	40	hrs	50	$/hr																																																												
				UST DH	20	hrs	0	$/hr																																																												
3.2.2	Airframe Maintenance	6/7/21	7/30/21	UST LCPO	100	hrs	0	$/hr																																																												
				UST PO3	200	hrs	40	$/hr																																																												
				UST PO4	200	hrs	40	$/hr																																																												
3.3.1	GCS Delivery	5/24/21	7/16/21	UST LCPO	5	hrs	0	$/hr																																																												
				UST PO3	10	hrs	20	$/hr																																																												
				UST PO4	10	hrs	20	$/hr																																																												
				Funds		N/A	3,000,000	$																																																												
3.3.2	Simulator Delivery	5/24/21	7/16/21	UST DH	10	hrs	0	$/hr																																																												
				UST MO	5	hrs	50	$/hr																																																												
				GAS	10	hrs	0	$/hr																																																												
3.3.3	GSE Delivery	5/24/21	7/16/21	UST PO3	10	hrs	40	$/hr																																																												
				UST MO	10	hrs	50	$/hr																																																												
				UST PO4	10	hrs	40	$/hr																																																												
3.3.4	Tools/Parts Delivery	5/24/21	7/16/21	UST MO	10	hrs	50	$/hr																																																												
				UST LCPO	10	hrs	0	$/hr																																																												
				UST PO3	10	hrs	40	$/hr																																																												
3.3.5	Sensors Delivery	5/24/21	7/16/21	UST MO	10	hrs	50	$/hr																																																												
				UST PO4	10	hrs	40	$/hr																																																												
				UST LCPO	10	hrs	0	$/hr																																																												
3.4	Simulator Check-out	7/19/21	7/23/21	UST OPS	10	hrs	0	$/hr																																																												
				PM	10	hrs	50	$/hr																																																												
				GAS	5	hrs	0	$/hr																																																												
4.1	Platform Test Planning	5/24/21	6/18/21	PM	20	hrs	0	$/hr																																																												
				UST DH	10	hrs	0	$/hr																																																												
				UST MO	10	hrs	50	$/hr																																																												
4.2.1	Subsystem Testing	7/19/21	8/6/21	PM	20	hrs	50	$/hr																																																												
				UST MO	10	hrs	50	$/hr																																																												
				GAS	20	hrs	0	$/hr																																																												
				PM	20	hrs	50	$/hr																																																												

Figure B-3: Resource Loading Chart (2 of 5)

Resource Loading Chart

WBS ID	Activity Name	Start Date	End Date	Resources Needed	Total Time	Units	Cost	Cost Unit	5/9/21 Week 31 Cost	5/10/21 Week 32 Time	5/16/21 Week 32 Cost	5/17/21 Week 33 Time	5/23/21 Week 33 Cost	5/24/21 Week 34 Time	5/30/21 Week 34 Cost	5/31/21 Week 35 Time	6/6/21 Week 35 Cost	6/7/21 Week 36 Time	6/13/21 Week 36 Cost	6/14/21 Week 37 Time	6/20/21 Week 37 Cost	6/21/21 Week 38 Time	6/27/21 Week 38 Cost	6/28/21 Week 39 Time	7/4/21 Week 39 Cost	7/5/21 Week 40 Time	7/11/21 Week 40 Cost	7/12/21 Week 41 Time	7/18/21 Week 41 Cost	7/19/21 Week 42 Time	7/25/21 Week 42 Cost	7/26/21 Week 43 Time	8/1/21 Week 43 Cost	8/2/21 Week 44 Time	8/8/21 Week 44 Cost	8/9/21 Week 45 Time	8/15/21 Week 45 Cost
2.3.3	Final Project Selection Decision	1/18/21	2/5/21	TS3 CO	2	hrs	0	$/hr																													
				TS3 CTP	2	hrs	0	$/hr																													
				TS3 TD	2	hrs	0	$/hr																													
				UST DH	4	hrs	0	$/hr																													
				PM	20	hrs	50	$/hr																													
2.4.1	Fine Training Plan Development	2/8/21	2/19/21	UST DH	2	hrs	0	$/hr																													
				PM	10	hrs	50	$/hr																													
				UST MO	10	hrs	50	$/hr																													
				UST OPS	10	hrs	0	$/hr																													
				UST LCPO	10	hrs	0	$/hr																													
2.4.2	Fine Acquisition Plan Development	2/8/21	2/19/21	UST DH	4	hrs	0	$/hr																													
				PM	10	hrs	50	$/hr																													
				UST MO	5	hrs	50	$/hr																													
2.4.3	Fine Integration Plan Development	2/8/21	2/19/21	UST DH	2	hrs	0	$/hr																													
				PM	10	hrs	50	$/hr																													
				UST MO	5	hrs	50	$/hr																													
				GAS	5	hrs	0	$/hr																													
2.4.4	Updated Scheduling	2/22/21	2/26/21	PM	15	hrs	50	$/hr																													
				UST MO	10	hrs	50	$/hr																													
				GAS	5	hrs	0	$/hr																													
2.4.5	Contract Award	3/1/21	5/21/21	UST DH	12	hrs	0	$/hr	$0	1	$0	1	$0																							
				PM	40	hrs	50	$/hr	$200	4	$200	4	$200																								
				BFM	40	hrs	50	$/hr	$200	4	$200	4	$200																								
				GAS	40	hrs	0	$/hr	$0	4	$0	4	$0																								
3.1.1	Aircrew Training	5/24/21	7/2/21	UST OPS	240	hrs	0	$/hr						40	$0	40	$0	40	$0	40	$0	40	$0	40	$0	40	$0											
				UST Divo	240	hrs	0	$/hr						40	$0	40	$0	40	$0	40	$0	40	$0	40	$0	40	$0											
				PM	240	hrs	50	$/hr						40	$2,000	40	$2,000	40	$2,000	40	$2,000	40	$2,000	40	$2,000	40	$2,000											
3.1.2	Maintenance Training	5/24/21	7/2/21	UST LPO	240	hrs	0	$/hr						40	$0	40	$0	40	$0	40	$0	40	$0	40	$0	40	$0											
				UST PO1	240	hrs	40	$/hr						40	$1,600	40	$1,600	40	$1,600	40	$1,600	40	$1,600	40	$1,600	40	$1,600											
				UST PO2	240	hrs	40	$/hr						40	$1,600	40	$1,600	40	$1,600	40	$1,600	40	$1,600	40	$1,600	40	$1,600											
3.2.1	Airframe Delivery	5/24/21	6/4/21	USNTD	10	hrs	0	$/hr						5	$0	5	$0																				
				UST MO	40	hrs	50	$/hr						20	$1,000	20	$1,000																				
				UST DH	20	hrs	0	$/hr						10	$0	10	$0																				
3.2.2	Airframe Maintenance	6/7/21	7/30/21	UST LCPO	100	hrs	0	$/hr										10	$0	10	$0	20	$0	10	$0	20	$0	10	$0	10	$0	10	$0				
				UST PO3	200	hrs	40	$/hr										20	$800	20	$800	30	$1,200	30	$1,200	30	$1,200	30	$1,200	20	$800	20	$800				
				UST PO4	200	hrs	40	$/hr										20	$800	20	$800	30	$1,200	30	$1,200	30	$1,200	30	$1,200	20	$800	20	$800				
3.3.1	GCS Delivery	5/24/21	7/16/21	UST LCPO	5	hrs	0	$/hr						0	$0	0	$0	0	$0	0	$0	0	$0	1	$0	2	$0	2	$0								
				UST PO3	10	hrs	20	$/hr						1	$20	1	$20	1	$20	1	$20	1	$20	1	$20	2	$40	2	$40								
				UST PO4	10	hrs	20	$/hr						1	$20	1	$20	1	$20	1	$20	1	$20	1	$20	2	$40	2	$40								
				Funds		N/A	3,000,000	$						0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0								
3.3.2	Simulator Delivery	5/24/21	7/16/21	UST DH	10	hrs	0	$/hr						1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0								
				UST MO	5	hrs	50	$/hr						0	$0	0	$0	0	$0	0	$0	0	$0	1	$50	2	$100	2	$100								
				GAS	10	hrs	0	$/hr						1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0								
3.3.3	GSE Delivery	5/24/21	7/16/21	UST PO3	10	hrs	40	$/hr						1	$40	1	$40	1	$40	1	$40	1	$40	1	$40	2	$80	2	$80								
				UST MO	10	hrs	50	$/hr						1	$50	1	$50	1	$50	1	$50	1	$50	1	$50	2	$100	2	$100								
				UST PO4	10	hrs	40	$/hr						1	$40	1	$40	1	$40	1	$40	1	$40	1	$40	2	$80	2	$80								
3.3.4	Tools/Parts Delivery	5/24/21	7/16/21	UST MO	10	hrs	50	$/hr						1	$50	1	$50	1	$50	1	$50	1	$50	1	$50	2	$100	2	$100								
				UST LCPO	10	hrs	0	$/hr						1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0								
				UST PO3	10	hrs	40	$/hr						1	$40	1	$40	1	$40	1	$40	1	$40	1	$40	2	$80	2	$80								
3.3.5	Sensors Delivery	5/24/21	7/16/21	UST MO	10	hrs	50	$/hr						1	$50	1	$50	1	$50	1	$50	1	$50	1	$50	2	$100	2	$100								
				UST PO4	10	hrs	40	$/hr						1	$40	1	$40	1	$40	1	$40	1	$40	1	$40	2	$80	2	$80								
				UST LCPO	10	hrs	0	$/hr						1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0								
3.4	Simulator Check-out	7/19/21	7/23/21	UST OPS	10	hrs	0	$/hr																						10	$0						
				PM	10	hrs	50	$/hr																						10	$500						
				GAS	5	hrs	0	$/hr																						5	$0						
4.1	Platform Test Planning	5/24/21	6/18/21	PM	20	hrs	0	$/hr						5	$0	5	$0	5	$0	5	$0																
				UST DH	10	hrs	0	$/hr						2	$0	2	$0	2	$0	4	$0																
				UST MO	10	hrs	50	$/hr						2	$100	2	$100	2	$100	4	$200																
4.2.1	Subsystem Testing	7/19/21	8/6/21	PM	20	hrs	50	$/hr																						6	$300	7	$350	7	$350		
				UST MO	10	hrs	50	$/hr																						3	$150	3	$150	4	$200		
				GAS	20	hrs	0	$/hr																						6	$0	7	$0	7	$0		
				PM	20	hrs	50	$/hr																											10	$500		

Figure B-4: Resource Loading Chart (3 of 5)

Resource Loading Chart

WBS ID	Activity Name	Start Date	End Date	Resources Needed	Total Time	Units	Cost	Cost Unit	8/16/21		8/22/21		8/23/21		8/29/21		8/30/21		9/5/21		9/6/21		9/12/21		9/13/21		9/19/21		9/20/21		9/26/21		9/27/21		10/3/21		10/4/21		10/10/21		10/11/21		10/17/21		10/18/21		10/24/21		10/25/21		10/31/21		11/1/21		11/7/21		11/8/21		11/14/21		11/15/21		11/21/21		11/22/21	
									Week 46				Week 47				Week 48				Week 49				Week 50				Week 51				Week 52		Week 53				Week 54				Week 55				Week 56				Week 57				Week 58				Week 59			
									Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time
4.2.2	Airframe Ground Testing	8/9/21	8/20/21	UST OPS	20	hrs	0	$/hr	10	$0																																																		
				GAS	20	hrs	0	$/hr	10	$0																																																	
4.2.3	Integrated Ground Testing	8/23/21	9/3/21	PM	20	hrs	50	$/hr					10	$500	10	$500																																													
				UST OPS	20	hrs	0	$/hr					10	$0	10	$0																																													
				UST LCPO	20	hrs	0	$/hr					10	$0	10	$0																																													
				GAS	20	hrs	0	$/hr					10	$0	10	$0																																												
4.3.1	Flight Readiness Review	9/6/21	9/17/21	TS3 CTP	6	hrs	0	$/hr													4	$0	2	$0																																						
				TS3 CTE	6	hrs	70	$/hr													4	$280	2	$140																																						
				UST DH	10	hrs	0	$/hr													5	$0	5	$0																																						
				PM	40	hrs	50	$/hr													20	$1,000	20	$1,000																																						
4.3.2	Platform Flight Testing	9/20/21	10/1/21	UST DH	40	hrs	0	$/hr																					20	$0	20	$0																																
				PM	40	hrs	50	$/hr																					20	$1,000	20	$1,000																																
				UST OPS	40	hrs	0	$/hr																					20	$0	20	$0																																
				UST PO1	40	hrs	40	$/hr																					20	$800	20	$800																																
				UST PO2	40	hrs	40	$/hr																					20	$800	20	$800																																
				GAS	40	hrs	0	$/hr																					20	$0	20	$0																																
4.4	Platform Flight Test Reporting	10/4/21	10/29/21	UST DH	10	hrs	0	$/hr																											2	$0	2	$0	2	$0	4	$0																				
				PM	40	hrs	50	$/hr																											10	$500	10	$500	10	$500	10	$500																				
				UST OPS	10	hrs	0	$/hr																											2	$0	2	$0	2	$0	4	$0																				
5.1	Sensors / RS&C Test Planning	10/4/21	10/22/21	UST DH	10	hrs	0	$/hr																											3	$0	3	$0	4	$0																				
				PM	40	hrs	50	$/hr																											10	$500	15	$750	15	$750																				
				UST OPS	10	hrs	0	$/hr																											3	$0	3	$0	4	$0																				
5.2.1	Sensors Ground Testing	10/25/21	11/5/21	PM	40	hrs	50	$/hr																																					20	$1,000	20	$1,000												
				UST OPS	40	hrs	0	$/hr																																					20	$0	20	$0												
				GAS	20	hrs	0	$/hr																																					10	$0	10	$0												
5.2.2	Integrated Sensors Ground Testing	11/8/21	11/19/21	PM	40	hrs	50	$/hr																																										20	$1,000	20	$1,000				
				UST OPS	40	hrs	0	$/hr																																									20	$0	20	$0				
				UST PO1	40	hrs	40	$/hr																																									20	$800	20	$800				
				UST PO2	40	hrs	40	$/hr																																									20	$800	20	$800				
				GAS	20	hrs	0	$/hr																																									10	$0	10	$0				
5.2.3	Sensors Flight Testing	11/22/21	12/10/21	PM	60	hrs	50	$/hr																																																		20
				UST OPS	40	hrs	0	$/hr																																																	0
				UST PO1	40	hrs	40	$/hr																																																0
				UST PO2	40	hrs	40	$/hr																																																0
				GAS	20	hrs	0	$/hr																																																	0
5.3	RS&C Test Flight	12/13/21	12/31/21	PM	60	hrs	50	$/hr																																																		
				UST OPS	40	hrs	0	$/hr																																																	
				UST PO1	40	hrs	40	$/hr																																																
				UST PO2	40	hrs	40	$/hr																																																
				GAS	20	hrs	0	$/hr																																																
				Funds		N/A	1,000,000	$																																																
5.4	Simulator Verification and Validation	1/3/22	1/14/22	PM	10	hrs	50	$/hr																																																	
				UST OPS	20	hrs	0	$/hr																																															
				GAS	20	hrs	0	$/hr																																															
5.5	Sensors / RS&C Flight Test Reporting	1/3/22	1/28/22	TS3 CO	2	hrs	0	$/hr																																																
				UST DH	5	hrs	0	$/hr																																															
				PM	40	hrs	50	$/hr																																															

Figure B-5: Resource Loading Chart (4 of 5)

Resource Loading Chart

WBS ID	Activity Name	Start Date	End Date	Resources Needed	Total Time	Units	Cost	Cost Unit	11/28/21 Week 60 Cost	11/29/21 Week 61 Time	12/5/21 Week 61 Cost	12/6/21 Week 62 Time	12/12/21 Week 62 Cost	12/13/21 Week 63 Time	12/19/21 Week 63 Cost	12/20/21 Week 64 Time	12/26/21 Week 64 Cost	12/27/21 Week 65 Time	1/2/22 Week 65 Cost	1/3/22 Week 66 Time	1/9/22 Week 66 Cost	1/10/22 Week 67 Time	1/16/22 Week 67 Cost	1/17/22 Week 68 Time	1/23/22 Week 68 Cost	1/24/22 Week 69 Time	1/30/22 Week 69 Cost
4.2.2	Airframe Ground Testing	8/9/21	8/20/21	UST OPS	20	hrs	0	$/hr																			
				GAS	20	hrs	0	$/hr																			
4.2.3	Integrated Ground Testing	8/23/21	9/3/21	PM	20	hrs	50	$/hr																			
				UST OPS	20	hrs	0	$/hr																			
				UST LCPO	20	hrs	0	$/hr																			
				GAS	20	hrs	0	$/hr																			
4.3.1	Flight Readiness Review	9/6/21	9/17/21	TS3 CTP	6	hrs	0	$/hr																			
				TS3 CTE	6	hrs	70	$/hr																			
				UST DH	10	hrs	0	$/hr																			
				PM	40	hrs	50	$/hr																			
4.3.2	Platform Flight Testing	9/20/21	10/1/21	UST DH	40	hrs	0	$/hr																			
				PM	40	hrs	50	$/hr																			
				UST OPS	40	hrs	0	$/hr																			
				UST PO1	40	hrs	40	$/hr																			
				UST PO2	40	hrs	40	$/hr																			
				GAS	40	hrs	0	$/hr																			
4.4	Platform Flight Test Reporting	10/4/21	10/29/21	UST DH	10	hrs	0	$/hr																			
				PM	40	hrs	50	$/hr																			
				UST OPS	10	hrs	0	$/hr																			
5.1	Sensors / RS&C Test Planning	10/4/21	10/22/21	UST DH	10	hrs	0	$/hr																			
				PM	40	hrs	50	$/hr																			
				UST OPS	10	hrs	0	$/hr																			
5.2.1	Sensors Ground Testing	10/25/21	11/5/21	PM	40	hrs	50	$/hr																			
				UST OPS	40	hrs	0	$/hr																			
				GAS	20	hrs	0	$/hr																			
5.2.2	Integrated Sensors Ground Testing	11/8/21	11/19/21	PM	40	hrs	50	$/hr																			
				UST OPS	40	hrs	0	$/hr																			
				UST PO1	40	hrs	40	$/hr																			
				UST PO2	40	hrs	40	$/hr																			
				GAS	20	hrs	0	$/hr																			
5.2.3	Sensors Flight Testing	11/22/21	12/10/21	PM	60	hrs	50	$/hr	$1,000	20	$1,000	20	$1,000														
				UST OPS	40	hrs	0	$/hr	$0	20	$0	20	$0														
				UST PO1	40	hrs	40	$/hr	$0	20	$800	20	$800														
				UST PO2	40	hrs	40	$/hr	$0	20	$800	20	$800														
				GAS	20	hrs	0	$/hr	$0	10	$0	10	$0														
5.3	RS&C Test Flight	12/13/21	12/31/21	PM	60	hrs	50	$/hr						20	$1,000	20	$1,000	20	$1,000								
				UST OPS	40	hrs	0	$/hr						10	$0	10	$0	20	$0								
				UST PO1	40	hrs	40	$/hr						0	$0	20	$800	20	$800								
				UST PO2	40	hrs	40	$/hr						0	$0	20	$800	20	$800								
				GAS	20	hrs	0	$/hr						0	$0	10	$0	10	$0								
				Funds		N/A	1,000,000	$										1	$1,000,000								
5.4	Simulator Verification and Validation	1/3/22	1/14/22	PM	10	hrs	50	$/hr												5	$250	5	$250				
				UST OPS	20	hrs	0	$/hr												10	$0	10	$0				
				GAS	20	hrs	0	$/hr												10	$0	10	$0				
5.5	Sensors / RS&C Flight Test Reporting	1/3/22	1/28/22	TS3 CO	2	hrs	0	$/hr												1	$0	0	$0	0	$0	1	$0
				UST DH	5	hrs	0	$/hr												2	$0	0	$0	0	$0	3	$0
				PM	40	hrs	50	$/hr												10	$500	10	$500	10	$500	10	$500

Figure B-6: Resource Loading Chart (5 of 5)

Time-Phased Budget									10/5/20	10/11/20	10/12/20	10/18/20	10/19/20	10/25/20	10/26/20	11/1/20	11/2/20	11/8/20	11/9/20	11/15/20	11/16/20	11/22/20	11/23/20	11/29/20	11/30/20	12/6/20	12/7/20	12/13/20	12/14/20	12/20/20	12/21/20	12/27/20	12/28/20	1/3/21	1/4/21	1/10/21
									Week 1		Week 2		Week 3		Week 4		Week 5		Week 6		Week 7		Week 8		Week 9		Week 10		Week 11		Week 12		Week 13		Week 14	
WBS ID	Activity Name	Resources Needed	Total Time	Units	Cost	Cost Unit	Overh %	Overh Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost
1.1	Requirements Generation	PM	6	hrs	50	$/hr	25%	$63	3	$188	3	$188																								
		UST DH	1	hrs	0	$/hr	25%	$0	0	$0	1	$0																								
		RS&C SME	1	hrs	60	$/hr	25%	$75	0	$0	1	$75																								
		UST OPS	1	hrs	0	$/hr	25%	$0	0	$0	1	$0																								
		UST Divo	1	hrs	0	$/hr	25%	$0	0	$0	1	$0																								
1.2	Platform-Specific Initial CONOPS Development	PM	30	hrs	50	$/hr	25%	$63					10	$625	10	$625	10	$625																		
		UST DH	20	hrs	0	$/hr	25%	$0					7	$0	7	$0	6	$0																		
		UST OPS	20	hrs	0	$/hr	25%	$0					7	$0	7	$0	6	$0																		
		UST Divo	20	hrs	0	$/hr	25%	$0					7	$0	7	$0	6	$0																		
1.3	Initial Platform Financial and Multi-Criteria Analysis	PM	20	hrs	50	$/hr	25%	$63											10	$625	10	$625														
		UST DH	3	hrs	0	$/hr	25%	$0											0	$0	3	$0														
		UST OPS	3	hrs	0	$/hr	25%	$0											0	$0	3	$0														
		UST Divo	3	hrs	0	$/hr	25%	$0											0	$0	3	$0														
1.4	Command Project Review and Continuation Board	TS3 CO	1	hrs	0	$/hr	25%	$0															0	$0	1	$0										
		UST DH	3	hrs	0	$/hr	25%	$0															2	$0	1	$0										
		PM	10	hrs	50	$/hr	25%	$63															5	$313	5	$313										
		TS3 CTP	1	hrs	0	$/hr	25%	$0															0	$0	1	$0										
		TS3 TD	1	hrs	0	$/hr	25%	$0															0	$0	1	$0										
		UST OPS	2	hrs	0	$/hr	25%	$0															1	$0	1	$0										
		UST Divo	2	hrs	0	$/hr	25%	$0															1	$0	1	$0										
2.1.1	Fine CONOPS Development	UST DH	3	hrs	0	$/hr	25%	$0																			1	$0	1	$0	1	$0				
		PM	15	hrs	50	$/hr	25%	$63																			5	$313	5	$313	5	$313				
		UST OPS	3	hrs	0	$/hr	25%	$0																			1	$0	1	$0	1	$0				
		UST Divo	3	hrs	0	$/hr	25%	$0																			1	$0	1	$0	1	$0				
2.1.2	RFP Solicitation	BFM	5	hrs	50	$/hr	25%	$63																			2	$125	3	$188						
		PM	15	hrs	50	$/hr	25%	$63																			7	$438	8	$500						
		UST MO	5	hrs	50	$/hr	25%	$63																			2	$125	3	$188						
2.1.3	Training/Acquisition Plan Development	UST DH	10	hrs	0	$/hr	25%	$0																			5	$0	5	$0						
		PM	15	hrs	50	$/hr	25%	$63																			7	$438	8	$500						
		UST OPS	10	hrs	0	$/hr	25%	$0																			5	$0	5	$0						
		UST MO	10	hrs	50	$/hr	25%	$63																			5	$313	5	$313						
2.1.4	Initial Scheduling	UST DH	2	hrs	0	$/hr	25%	$0																							2	$0				
		PM	20	hrs	50	$/hr	25%	$63																							20	$1,250				
		UST MO	10	hrs	50	$/hr	25%	$63																							10	$625				
2.2.1	MCDM Matrix Generation	PM	10	hrs	50	$/hr	25%	$63																									10	$625		
		UST DH	3	hrs	0	$/hr	25%	$0																									3	$0		
		UST MO	3	hrs	50	$/hr	25%	$63																									3	$188		
		UST OPS	3	hrs	0	$/hr	25%	$0																									3	$0		
		UST Divo	3	hrs	0	$/hr	25%	$0																									3	$0		
2.2.2	Financial Model Generation	PM	10	hrs	50	$/hr	25%	$63																									10	$625		
		UST DH	2	hrs	0	$/hr	25%	$0																									2	$0		
		UST MO	4	hrs	50	$/hr	25%	$63																									4	$250		
		BFM	3	hrs	50	$/hr	25%	$63																									3	$188		
2.2.3	SME Ranking	UST DH	3	hrs	0	$/hr	25%	$0																									3	$0		
		PM	5	hrs	50	$/hr	25%	$63																									5	$313		
		UST MO	3	hrs	50	$/hr	25%	$63																									3	$188		
		UST OPS	3	hrs	0	$/hr	25%	$0																									3	$0		
		UST Divo	3	hrs	0	$/hr	25%	$0																									3	$0		
2.3.1	Squadron Leadership Briefing	TS3 CO	2	hrs	0	$/hr	25%	$0																											2	$0
		UST DH	5	hrs	0	$/hr	25%	$0																											5	$0
		PM	20	hrs	50	$/hr	25%	$63																											20	$1,250
		TS3 CTP	2	hrs	0	$/hr	25%	$0																											2	$0
		TS3 TD	2	hrs	0	$/hr	25%	$0																											2	$0
		UST MO	5	hrs	50	$/hr	25%	$63																											5	$313
		UST OPS	5	hrs	0	$/hr	25%	$0																											5	$0
		UST Divo	5	hrs	0	$/hr	25%	$0																											5	$0
		TS3 CO	2	hrs	0	$/hr	25%	$0																												
		TS3 CTP	2	hrs	0	$/hr	25%	$0																												

Figure B-7: Time-Phased Budget (1 of 6)

Time-Phased Budget

WBS ID	Activity Name	Resources Needed	Total Time	Units	Cost	Cost Unit	Overh %	Overh Cost	1/11/21	1/17/21	1/18/21	1/24/21	1/25/21	1/31/21	2/1/21	2/7/21	2/8/21	2/14/21	2/15/21	2/21/21	2/22/21	2/28/21	3/1/21	3/7/21	3/8/21	3/14/21	3/15/21	3/21/21	3/22/21	3/28/21	3/29/21	4/4/21	4/5/21	4/11/21	4/12/21	4/18/21	4/19/21
									Week 15		Week 16		Week 17		Week 18		Week 19		Week 20		Week 21		Week 22		Week 23		Week 24		Week 25		Week 26		Week 27		Week 28		Wee
									Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time
2.3.2	Senior Leadership Briefing	TS3 TD	2	hrs	0	$/hr	25%	$0	2	$0																											
		UST DH	5	hrs	0	$/hr	25%	$0	5	$0																											
		UST PM	15	hrs	50	$/hr	25%	$63	15	$938																											
		NAWC Commodore	1	hrs	0	$/hr	25%	$0	1	$0																											
2.3.3	Final Project Selection Decision	TS3 CO	2	hrs	0	$/hr	25%	$0			0	$0	1	$0	1	$0																					
		TS3 CTP	2	hrs	0	$/hr	25%	$0			0	$0	1	$0	1	$0																					
		TS3 TD	2	hrs	0	$/hr	25%	$0			0	$0	1	$0	1	$0																					
		UST DH	4	hrs	0	$/hr	25%	$0			1	$0	1	$0	2	$0																					
		PM	20	hrs	50	$/hr	25%	$63			5	$313	10	$625	5	$313																					
2.4.1	Fine Training Plan Development	UST DH	2	hrs	0	$/hr	25%	$0									1	$0	1	$0																	
		PM	10	hrs	50	$/hr	25%	$63									5	$313	5	$313																	
		UST MO	10	hrs	50	$/hr	25%	$63									5	$313	5	$313																	
		UST OPS	10	hrs	0	$/hr	25%	$0									5	$0	5	$0																	
		UST LCPO	10	hrs	0	$/hr	25%	$0									5	$0	5	$0																	
2.4.2	Fine Acquisition Plan Development	UST DH	4	hrs	0	$/hr	25%	$0									2	$0	2	$0																	
		PM	10	hrs	50	$/hr	25%	$63									5	$313	5	$313																	
		UST MO	5	hrs	50	$/hr	25%	$63									2	$125	3	$188																	
2.4.3	Fine Integration Plan Development	UST DH	2	hrs	0	$/hr	25%	$0									1	$0	1	$0																	
		PM	10	hrs	50	$/hr	25%	$63									5	$313	5	$313																	
		UST MO	5	hrs	50	$/hr	25%	$63									2	$125	3	$188																	
		GAS	5	hrs	0	$/hr	25%	$0									2	$0	3	$0																	
2.4.4	Updated Scheduling	PM	15	hrs	50	$/hr	25%	$63													15	$938															
		UST MO	10	hrs	50	$/hr	25%	$63													10	$625															
		GAS	5	hrs	0	$/hr	25%	$0													5	$0															
2.4.5	Contract Award	UST DH	12	hrs	0	$/hr	25%	$0															1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	1
		PM	40	hrs	50	$/hr	25%	$63															2	$125	2	$125	2	$125	2	$125	2	$125	4	$250	4	$250	4
		BFM	40	hrs	50	$/hr	25%	$63															2	$125	2	$125	2	$125	2	$125	2	$125	4	$250	4	$250	4
		GAS	40	hrs	0	$/hr	25%	$0															2	$0	2	$0	2	$0	2	$0	2	$0	4	$0	4	$0	4
3.1.1	Aircrew Training	UST OPS	240	hrs	0	$/hr	25%	$0																													
		UST Divo	240	hrs	0	$/hr	25%	$0																													
		PM	240	hrs	50	$/hr	25%	$63																													
3.1.2	Maintenance Training	UST LPO	240	hrs	0	$/hr	25%	$0																													
		UST PO1	240	hrs	40	$/hr	25%	$50																													
		UST PO2	240	hrs	40	$/hr	25%	$50																													
3.2.1	Airframe Delivery	USNTD	10	hrs	0	$/hr	25%	$0																													
		UST MO	40	hrs	50	$/hr	25%	$63																													
		UST DH	20	hrs	0	$/hr	25%	$0																													
3.2.2	Airframe Maintenance	UST LCPO	100	hrs	0	$/hr	25%	$0																													
		UST PO3	200	hrs	40	$/hr	25%	$50																													
		UST PO4	200	hrs	40	$/hr	25%	$50																													
3.3.1	GCS Delivery	UST LCPO	5	hrs	0	$/hr	25%	$0																													
		UST PO3	10	hrs	20	$/hr	25%	$25																													
		UST PO4	10	hrs	20	$/hr	25%	$25																													
		Funds		N/A	3,000,000	$	25%	$3,750,000																													
3.3.2	Simulator Delivery	UST DH	10	hrs	0	$/hr	25%	$0																													
		UST MO	5	hrs	50	$/hr	25%	$63																													
		GAS	10	hrs	0	$/hr	25%	$0																													
3.3.3	GSE Delivery	UST PO3	10	hrs	40	$/hr	25%	$50																													
		UST MO	10	hrs	50	$/hr	25%	$63																													
		UST PO4	10	hrs	40	$/hr	25%	$50																													
3.3.4	Tools/Parts Delivery	UST MO	10	hrs	50	$/hr	25%	$63																													
		UST LCPO	10	hrs	0	$/hr	25%	$0																													
		UST PO3	10	hrs	40	$/hr	25%	$50																													
3.3.5	Sensors Delivery	UST MO	10	hrs	50	$/hr	25%	$63																													
		UST PO4	10	hrs	40	$/hr	25%	$50																													
		UST LCPO	10	hrs	0	$/hr	25%	$0																													
		UST OPS	10	hrs	0	$/hr	25%	$0																													

Figure B-8: Time-Phased Budget (2 of 6)

Time-Phased Budget

WBS ID	Activity Name	Resources Needed	Total Time	Units	Cost	Cost Unit	Overh %	Overh Cost	4/25/21	4/26/21	5/2/21	5/9/21	5/9/21	5/10/21	5/16/21	5/17/21	5/23/21	5/24/21	5/30/21	5/31/21	6/6/21	6/7/21	6/13/21	6/14/21	6/20/21	6/21/21	6/27/21	6/28/21	7/4/21	7/5/21	7/11/21	7/12/21	7/18/21	7/19/21
									k 29	Week 30		Week 31		Week 32		Week 33		Week 34		Week 35		Week 36		Week 37		Week 38		Week 39		Week 40		Week 41		Wee
									Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time
2.3.2	Senior Leadership Briefing	TS3 TD	2	hrs	0	$/hr	25%	$0																										
		UST DH	5	hrs	0	$/hr	25%	$0																										
		UST PM	15	hrs	50	$/hr	25%	$83																										
		NAWC Commodore	1	hrs	0	$/hr	25%	$0																										
2.3.3	Final Project Selection Decision	TS3 CO	2	hrs	0	$/hr	25%	$0																										
		TS3 CTP	2	hrs	0	$/hr	25%	$0																										
		TS3 TD	2	hrs	0	$/hr	25%	$0																										
		UST DH	4	hrs	0	$/hr	25%	$0																										
		PM	20	hrs	50	$/hr	25%	$83																										
2.4.1	Fine Training Plan Development	UST DH	2	hrs	0	$/hr	25%	$0																										
		PM	10	hrs	50	$/hr	25%	$83																										
		UST MO	10	hrs	50	$/hr	25%	$83																										
		UST OPS	10	hrs	0	$/hr	25%	$0																										
		UST LCPO	10	hrs	0	$/hr	25%	$0																										
2.4.2	Fine Acquisition Plan Development	UST DH	4	hrs	0	$/hr	25%	$0																										
		PM	10	hrs	50	$/hr	25%	$83																										
		UST MO	5	hrs	50	$/hr	25%	$83																										
2.4.3	Fine Integration Plan Development	UST DH	2	hrs	0	$/hr	25%	$0																										
		PM	10	hrs	50	$/hr	25%	$83																										
		UST MO	5	hrs	50	$/hr	25%	$83																										
		GAS	5	hrs	0	$/hr	25%	$0																										
2.4.4	Updated Scheduling	PM	15	hrs	50	$/hr	25%	$83																										
		UST MO	10	hrs	50	$/hr	25%	$83																										
		GAS	5	hrs	0	$/hr	25%	$0																										
2.4.5	Contract Award	UST DH	12	hrs	0	$/hr	25%	$0	$0	1	$0	1	$0	1	$0	1	$0																	
		PM	40	hrs	50	$/hr	25%	$83	$250	4	$250	4	$250	4	$250	4	$250																	
		BFM	40	hrs	50	$/hr	25%	$83	$250	4	$250	4	$250	4	$250	4	$250																	
		GAS	40	hrs	0	$/hr	25%	$0	$0	4	$0	4	$0	4	$0	4	$0																	
3.1.1	Aircrew Training	UST OPS	240	hrs	0	$/hr	25%	$0										40	$0	40	$0	40	$0	40	$0	40	$0	40	$0					
		UST Divo	240	hrs	0	$/hr	25%	$0										40	$0	40	$0	40	$0	40	$0	40	$0	40	$0					
		PM	240	hrs	50	$/hr	25%	$83										40	$2,500	40	$2,500	40	$2,500	40	$2,500	40	$2,500	40	$2,500					
3.1.2	Maintenance Training	UST LPO	240	hrs	0	$/hr	25%	$0										40	$0	40	$0	40	$0	40	$0	40	$0	40	$0					
		UST PO1	240	hrs	40	$/hr	25%	$50										40	$2,000	40	$2,000	40	$2,000	40	$2,000	40	$2,000	40	$2,000					
		UST PO2	240	hrs	40	$/hr	25%	$50										40	$2,000	40	$2,000	40	$2,000	40	$2,000	40	$2,000	40	$2,000					
3.2.1	Airframe Delivery	USNTD	10	hrs	0	$/hr	25%	$0										5	$0	5	$0													
		UST MO	40	hrs	50	$/hr	25%	$83										20	$1,250	20	$1,250													
		UST DH	20	hrs	0	$/hr	25%	$0										10	$0	10	$0													
3.2.2	Airframe Maintenance	UST LCPO	100	hrs	0	$/hr	25%	$0														10	$0	10	$0	20	$0	10	$0	20	$0	10	$0	10
		UST PO3	200	hrs	40	$/hr	25%	$50														20	$1,000	20	$1,000	30	$1,500	30	$1,500	30	$1,500	30	$1,500	20
		UST PO4	200	hrs	40	$/hr	25%	$50														20	$1,000	20	$1,000	30	$1,500	30	$1,500	30	$1,500	30	$1,500	20
3.3.1	GCS Delivery	UST LCPO	5	hrs	0	$/hr	25%	$0										0	$0	0	$0	0	$0	0	$0	0	$0	1	$0	2	$0	2	$0	
		UST PO3	10	hrs	20	$/hr	25%	$25										1	$25	1	$25	1	$25	1	$25	1	$25	1	$25	2	$50	2	$50	
		UST PO4	10	hrs	20	$/hr	25%	$25										1	$25	1	$25	1	$25	1	$25	1	$25	1	$25	2	$50	2	$50	
		Funds		N/A	3,000,000	$	25%	$3,750,000										0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	0	$0	1	$3,750,000	
3.3.2	Simulator Delivery	UST DH	10	hrs	0	$/hr	25%	$0										1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0	
		UST MO	5	hrs	50	$/hr	25%	$83										0	$0	0	$0	0	$0	0	$0	0	$0	1	$83	2	$125	2	$125	
		GAS	10	hrs	0	$/hr	25%	$0										1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0	
3.3.3	GSE Delivery	UST PO3	10	hrs	40	$/hr	25%	$50										1	$50	1	$50	1	$50	1	$50	1	$50	1	$50	2	$100	2	$100	
		UST MO	10	hrs	50	$/hr	25%	$83										1	$63	1	$63	1	$63	1	$63	1	$63	1	$63	2	$125	2	$125	
		UST PO4	10	hrs	40	$/hr	25%	$50										1	$50	1	$50	1	$50	1	$50	1	$50	1	$50	2	$100	2	$100	
3.3.4	Tools/Parts Delivery	UST MO	10	hrs	50	$/hr	25%	$83										1	$83	1	$83	1	$63	1	$63	1	$63	1	$63	2	$125	2	$125	
		UST LCPO	10	hrs	0	$/hr	25%	$0										1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0	
		UST PO3	10	hrs	40	$/hr	25%	$50										1	$50	1	$50	1	$50	1	$50	1	$50	1	$50	2	$100	2	$100	
3.3.5	Sensors Delivery	UST MO	10	hrs	50	$/hr	25%	$83										1	$63	1	$63	1	$63	1	$63	1	$63	1	$63	2	$125	2	$125	
		UST PO4	10	hrs	40	$/hr	25%	$50										1	$50	1	$50	1	$50	1	$50	1	$50	1	$50	2	$100	2	$100	
		UST LCPO	10	hrs	0	$/hr	25%	$0										1	$0	1	$0	1	$0	1	$0	1	$0	1	$0	2	$0	2	$0	
		UST OPS	10	hrs	0	$/hr	25%	$0																										10

Figure B-9: Time-Phased Budget (3 of 6)

Time-Phased Budget

WBS ID	Activity Name	Resources Needed	Total Time	Units	Cost	Cost Unit	Overh %	Overh Cost	4/25/21	4/26/21	5/2/21	5/3/21	5/9/21	5/10/21	5/16/21	5/17/21	5/23/21	5/24/21	5/30/21	5/31/21	6/6/21	6/7/21	6/13/21	6/14/21	6/20/21	6/21/21	6/27/21	6/28/21	7/4/21	7/5/21	7/11/21	7/12/21	7/18/21	7/19/21
									k 29	Week 30		Week 31		Week 32		Week 33		Week 34		Week 35		Week 36		Week 37		Week 38		Week 39		Week 40		Week 41		Wee
									Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time
3.4	Simulator Check-out	PM	10	hrs	50	$/hr	25%	$63																									10
		GAS	5	hrs	0	$/hr	25%	$0																									5
4.1	Platform Test Planning	PM	20	hrs	0	$/hr	25%	$0										5	$0	5	$0	5	$0	5	$0								
		UST DH	10	hrs	0	$/hr	25%	$0										2	$0	2	$0	2	$0	4	$0								
		UST MO	10	hrs	50	$/hr	25%	$63										2	$125	2	$125	2	$125	4	$250								
4.2.1	Subsystem Testing	PM	20	hrs	50	$/hr	25%	$63																									6
		UST MO	10	hrs	50	$/hr	25%	$63																									3
		GAS	20	hrs	0	$/hr	25%	$0																									6
4.2.2	Airframe Ground Testing	PM	20	hrs	50	$/hr	25%	$63																									
		UST OPS	20	hrs	0	$/hr	25%	$0																									
		GAS	20	hrs	0	$/hr	25%	$0																									
4.2.3	Integrated Ground Testing	PM	20	hrs	50	$/hr	25%	$63																									
		UST OPS	20	hrs	0	$/hr	25%	$0																									
		UST LCPO	20	hrs	0	$/hr	25%	$0																									
		GAS	20	hrs	0	$/hr	25%	$0																									
4.3.1	Flight Readiness Review	TS3 CTP	6	hrs	0	$/hr	25%	$0																									
		TS3 CTE	6	hrs	70	$/hr	25%	$88																									
		UST DH	10	hrs	0	$/hr	25%	$0																									
		PM	40	hrs	50	$/hr	25%	$63																									
4.3.2	Platform Flight Testing	UST DH	40	hrs	0	$/hr	25%	$0																									
		PM	40	hrs	50	$/hr	25%	$63																									
		UST OPS	40	hrs	0	$/hr	25%	$0																									
		UST PO1	40	hrs	40	$/hr	25%	$50																									
		UST PO2	40	hrs	40	$/hr	25%	$50																									
		GAS	40	hrs	0	$/hr	25%	$0																									
4.4	Platform Flight Test Reporting	UST DH	10	hrs	0	$/hr	25%	$0																									
		PM	40	hrs	50	$/hr	25%	$63																									
		UST OPS	10	hrs	0	$/hr	25%	$0																									
5.1	Sensors / RS&C Test Planning	UST DH	10	hrs	0	$/hr	25%	$0																									
		PM	40	hrs	50	$/hr	25%	$63																									
		UST OPS	10	hrs	0	$/hr	25%	$0																									
5.2.1	Sensors Ground Testing	PM	40	hrs	50	$/hr	25%	$63																									
		UST OPS	40	hrs	0	$/hr	25%	$0																									
		GAS	20	hrs	0	$/hr	25%	$0																									
5.2.2	Integrated Sensors Ground Testing	PM	40	hrs	50	$/hr	25%	$63																									
		UST OPS	40	hrs	0	$/hr	25%	$0																									
		UST PO1	40	hrs	40	$/hr	25%	$50																									
		UST PO2	40	hrs	40	$/hr	25%	$50																									
		GAS	20	hrs	0	$/hr	25%	$0																									
5.2.3	Sensors Flight Testing	PM	60	hrs	50	$/hr	25%	$63																									
		UST OPS	40	hrs	0	$/hr	25%	$0																									
		UST PO1	40	hrs	40	$/hr	25%	$50																									
		UST PO2	40	hrs	40	$/hr	25%	$50																									
		GAS	20	hrs	0	$/hr	25%	$0																									
5.3	RS&C Test Flight	PM	60	hrs	50	$/hr	25%	$63																									
		UST OPS	40	hrs	0	$/hr	25%	$0																									
		UST PO1	40	hrs	40	$/hr	25%	$50																									
		UST PO2	40	hrs	40	$/hr	25%	$50																									
		GAS	20	hrs	0	$/hr	25%	$0																									
		Funds		N/A	1,000,000	$	25%	$1,250,000																									
5.4	Simulator Verification and Validation	PM	10	hrs	50	$/hr	25%	$63																									
		UST OPS	20	hrs	0	$/hr	25%	$0																									
		GAS	20	hrs	0	$/hr	25%	$0																									
5.5	Sensors / RS&C Flight Test Reporting	TS3 CO	2	hrs	0	$/hr	25%	$0																									
		UST DH	5	hrs	0	$/hr	25%	$0																									
		PM	40	hrs	50	$/hr	25%	$63																									

Figure B- 10: Time-Phased Budget (4 of 6)

Time-Phased Budget

WBS ID	Activity Name	Resources Needed	Total Time	Units	Cost	Cost Unit	Overh %	Overh Cost	7/25/21	7/26/21	8/1/21	8/2/21	8/8/21	8/9/21	8/15/21	8/16/21	8/22/21	8/23/21	8/29/21	8/30/21	9/5/21	9/6/21	9/12/21	9/13/21	9/19/21	9/20/21	9/26/21	9/27/21	10/3/21	10/4/21	10/10/21	10/11/21	10/17/21	10/18/21	10/24/21	10/25/21
									k 42	Week 43		Week 44		Week 45		Week 46		Week 47		Week 48		Week 49		Week 50		Week 51		Week 52		Week 53		Week 54		Week 55		We
									Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time
3.4	Simulator Check-out	PM	10	hrs	50	$/hr	25%	$63	$625																										
		GAS	5	hrs	0	$/hr	25%	$0	$0																										
4.1	Platform Test Planning	PM	20	hrs	0	$/hr	25%	$0																											
		UST DH	10	hrs	0	$/hr	25%	$0																											
		UST MO	10	hrs	50	$/hr	25%	$63																											
4.2.1	Subsystem Testing	PM	20	hrs	50	$/hr	25%	$63	$375	7	$438	7	$438																						
		UST MO	10	hrs	50	$/hr	25%	$63	$188	3	$188	4	$250																						
		GAS	20	hrs	0	$/hr	25%	$0	$0	7	$0	7	$0																						
4.2.2	Airframe Ground Testing	PM	20	hrs	50	$/hr	25%	$63						10	$625	10	$625																		
		UST OPS	20	hrs	0	$/hr	25%	$0						10	$0	10	$0																		
		GAS	20	hrs	0	$/hr	25%	$0						10	$0	10	$0																		
4.2.3	Integrated Ground Testing	PM	20	hrs	50	$/hr	25%	$63										10	$625	10	$625														
		UST OPS	20	hrs	0	$/hr	25%	$0										10	$0	10	$0														
		UST LCPO	20	hrs	0	$/hr	25%	$0										10	$0	10	$0														
		GAS	20	hrs	0	$/hr	25%	$0										10	$0	10	$0														
4.3.1	Flight Readiness Review	TS3 CTP	6	hrs	0	$/hr	25%	$0														4	$0	2	$0										
		TS3 CTE	6	hrs	70	$/hr	25%	$88														4	$350	2	$175										
		UST DH	10	hrs	0	$/hr	25%	$0														5	$0	5	$0										
		PM	40	hrs	50	$/hr	25%	$63														20	$1,250	20	$1,250										
4.3.2	Platform Flight Testing	UST DH	40	hrs	0	$/hr	25%	$0																		20	$0	20	$0						
		PM	40	hrs	50	$/hr	25%	$63																		20	$1,250	20	$1,250						
		UST OPS	40	hrs	0	$/hr	25%	$0																		20	$0	20	$0						
		UST PO1	40	hrs	40	$/hr	25%	$50																		20	$1,000	20	$1,000						
		UST PO2	40	hrs	40	$/hr	25%	$50																		20	$1,000	20	$1,000						
		GAS	40	hrs	0	$/hr	25%	$0																		20	$0	20	$0						
4.4	Platform Flight Test Reporting	UST DH	10	hrs	0	$/hr	25%	$0																						2	$0	2	$0	2	$0	4
		PM	40	hrs	50	$/hr	25%	$63																						10	$625	10	$625	10	$625	10
		UST OPS	10	hrs	0	$/hr	25%	$0																						2	$0	2	$0	2	$0	4
5.1	Sensors / RS&C Test Planning	UST DH	10	hrs	0	$/hr	25%	$0																						3	$0	3	$0	4	$0	
		PM	40	hrs	50	$/hr	25%	$63																						10	$625	15	$938	15	$938	
		UST OPS	10	hrs	0	$/hr	25%	$0																						3	$0	3	$0	4	$0	
5.2.1	Sensors Ground Testing	PM	40	hrs	50	$/hr	25%	$63																											20
		UST OPS	40	hrs	0	$/hr	25%	$0																											20
		GAS	20	hrs	0	$/hr	25%	$0																											10
5.2.2	Integrated Sensors Ground Testing	PM	40	hrs	50	$/hr	25%	$63																											
		UST OPS	40	hrs	0	$/hr	25%	$0																											
		UST PO1	40	hrs	40	$/hr	25%	$50																											
		UST PO2	40	hrs	40	$/hr	25%	$50																											
		GAS	20	hrs	0	$/hr	25%	$0																											
5.2.3	Sensors Flight Testing	PM	60	hrs	50	$/hr	25%	$63																											
		UST OPS	40	hrs	0	$/hr	25%	$0																											
		UST PO1	40	hrs	40	$/hr	25%	$50																											
		UST PO2	40	hrs	40	$/hr	25%	$50																											
		GAS	20	hrs	0	$/hr	25%	$0																											
5.3	RS&C Test Flight	PM	60	hrs	50	$/hr	25%	$63																											
		UST OPS	40	hrs	0	$/hr	25%	$0																											
		UST PO1	40	hrs	40	$/hr	25%	$50																											
		UST PO2	40	hrs	40	$/hr	25%	$50																											
		GAS	20	hrs	0	$/hr	25%	$0																											
		Funds		N/A	1,000,000	$	25%	$1,250,000																											
5.4	Simulator Verification and Validation	PM	10	hrs	50	$/hr	25%	$63																											
		UST OPS	20	hrs	0	$/hr	25%	$0																											
		GAS	20	hrs	0	$/hr	25%	$0																											
5.5	Sensors / RS&C Flight Test Reporting	TS3 CO	2	hrs	0	$/hr	25%	$0																											
		UST DH	5	hrs	0	$/hr	25%	$0																											
		PM	40	hrs	50	$/hr	25%	$63																											

Figure B-11: Time-Phased Budget (5 of 6)

Time-Phased Budget

WBS ID	Activity Name	Resources Needed	Total Time	Units	Cost	Cost Unit	Overh %	Overh Cost	10/31/21	11/1/21	11/7/21	11/8/21	11/14/21	11/15/21	11/21/21	11/22/21	11/28/21	11/29/21	12/5/21	12/6/21	12/12/21	12/13/21	12/19/21	12/20/21	12/26/21	12/27/21	1/2/22	1/3/22	1/9/22	1/10/22	1/16/22	1/17/22	1/23/22	1/24/22	1/30/22
									ek 56	Week 57		Week 58		Week 59		Week 60		Week 61		Week 62		Week 63		Week 64		Week 65		Week 66		Week 67		Week 68		Week 69	
									Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost	Time	Cost
3.4	Simulator Check-out	PM	10	hrs	50	$/hr	25%	$63																											
		GAS	5	hrs	0	$/hr	25%	$0																											
4.1	Platform Test Planning	PM	20	hrs	0	$/hr	25%	$0																											
		UST DH	10	hrs	0	$/hr	25%	$0																											
		UST MO	10	hrs	50	$/hr	25%	$63																											
4.2.1	Subsystem Testing	PM	20	hrs	50	$/hr	25%	$63																											
		UST MO	10	hrs	50	$/hr	25%	$63																											
		GAS	20	hrs	0	$/hr	25%	$0																											
4.2.2	Airframe Ground Testing	PM	20	hrs	50	$/hr	25%	$63																											
		UST OPS	20	hrs	0	$/hr	25%	$0																											
		GAS	20	hrs	0	$/hr	25%	$0																											
4.2.3	Integrated Ground Testing	PM	20	hrs	50	$/hr	25%	$63																											
		UST OPS	20	hrs	0	$/hr	25%	$0																											
		UST LCPO	20	hrs	0	$/hr	25%	$0																											
		GAS	20	hrs	0	$/hr	25%	$0																											
4.3.1	Flight Readiness Review	TS3 CTP	6	hrs	0	$/hr	25%	$0																											
		TS3 CTE	6	hrs	70	$/hr	25%	$88																											
		UST DH	10	hrs	0	$/hr	25%	$0																											
		PM	40	hrs	50	$/hr	25%	$63																											
4.3.2	Platform Flight Testing	UST DH	40	hrs	0	$/hr	25%	$0																											
		PM	40	hrs	50	$/hr	25%	$63																											
		UST OPS	40	hrs	0	$/hr	25%	$0																											
		UST PO1	40	hrs	40	$/hr	25%	$50																											
		UST PO2	40	hrs	40	$/hr	25%	$50																											
		GAS	40	hrs	0	$/hr	25%	$0																											
4.4	Platform Flight Test Reporting	UST DH	10	hrs	0	$/hr	25%	$0	$0																										
		PM	40	hrs	50	$/hr	25%	$63	$625																										
		UST OPS	10	hrs	0	$/hr	25%	$0	$0																										
5.1	Sensors / RS&C Test Planning	UST DH	10	hrs	0	$/hr	25%	$0																											
		PM	40	hrs	50	$/hr	25%	$63																											
		UST OPS	10	hrs	0	$/hr	25%	$0																											
5.2.1	Sensors Ground Testing	PM	40	hrs	50	$/hr	25%	$63	$1,250	20	$1,250																								
		UST OPS	40	hrs	0	$/hr	25%	$0	$0	20	$0																								
		GAS	20	hrs	0	$/hr	25%	$0	$0	10	$0																								
5.2.2	Integrated Sensors Ground Testing	PM	40	hrs	50	$/hr	25%	$63				20	$1,250	20	$1,250																				
		UST OPS	40	hrs	0	$/hr	25%	$0				20	$0	20	$0																				
		UST PO1	40	hrs	40	$/hr	25%	$50				20	$1,000	20	$1,000																				
		UST PO2	40	hrs	40	$/hr	25%	$50				20	$1,000	20	$1,000																				
		GAS	20	hrs	0	$/hr	25%	$0				10	$0	10	$0																				
5.2.3	Sensors Flight Testing	PM	60	hrs	50	$/hr	25%	$63								20	$1,250	20	$1,250	20	$1,250														
		UST OPS	40	hrs	0	$/hr	25%	$0								0	$0	20	$0	20	$0														
		UST PO1	40	hrs	40	$/hr	25%	$50								0	$0	20	$1,000	20	$1,000														
		UST PO2	40	hrs	40	$/hr	25%	$50								0	$0	20	$1,000	20	$1,000														
		GAS	20	hrs	0	$/hr	25%	$0								0	$0	10	$0	10	$0														
5.3	RS&C Test Flight	PM	60	hrs	50	$/hr	25%	$63														20	$1,250	20	$1,250	20	$1,250								
		UST OPS	40	hrs	0	$/hr	25%	$0														10	$0	10	$0	20	$0								
		UST PO1	40	hrs	40	$/hr	25%	$50														0	$0	20	$1,000	20	$1,000								
		UST PO2	40	hrs	40	$/hr	25%	$50														0	$0	20	$1,000	20	$1,000								
		GAS	20	hrs	0	$/hr	25%	$0														0	$0	10	$0	10	$0								
		Funds		N/A	1,000,000	$	25%	$1,250,000																		1	$1,250,000								
5.4	Simulator Verification and Validation	PM	10	hrs	50	$/hr	25%	$63																				5	$313	5	$313				
		UST OPS	20	hrs	0	$/hr	25%	$0																				10	$0	10	$0				
		GAS	20	hrs	0	$/hr	25%	$0																				10	$0	10	$0				
5.5	Sensors / RS&C Flight Test Reporting	TS3 CO	2	hrs	0	$/hr	25%	$0																				1	$0	0	$0	0	$0	1	$0
		UST DH	5	hrs	0	$/hr	25%	$0																				2	$0	0	$0	0	$0	3	$0
		PM	40	hrs	50	$/hr	25%	$63																				10	$625	10	$625	10	$625	10	$625

Figure B-12: Time-Phased Budget (6 of 6)