1. Summary

This document provides a comprehensive outline of operational scenarios for the Combat and Humanitarian Airlift Multi-role Platform (CHAMP). Developed to articulate the diverse operational requirements and environmental conditions CHAMP is anticipated to encounter, the scenarios serve as a foundational framework for the system’s design, development, and evaluation.

The scenarios are structured to explore CHAMP’s roles in combat and humanitarian operations, specifically focusing on airlift operations, air-to-air refueling, medical evacuation (MEDEVAC), and humanitarian air drops. Each scenario vignette is meticulously crafted to offer insights into specific operational facets, ensuring a balanced and comprehensive exploration of anticipated roles and challenges.

Section 2 outlines the scope, including the background, method, constraints, and structure of the document. Section 3 presents the overall scenario, providing a general context for CHAMP’s operations. Sections 4 to 7 offer detailed scenario vignettes, each focused on a particular operational task, enriched with objectives, success criteria, and environmental conditions to provide a holistic view of CHAMP’s operational landscape.

The document is intended to be a resource for stakeholders involved in the design, development, testing, and evaluation of CHAMP, offering a scenario-based perspective to inform and guide the engineering and operational adaptation of the system to meet real-world demands and challenges.
3. Overall Scenario: Operation Northern Guardian

3.1 Objectives and Success Criteria

The CHAMP is deployed in a UN-sanctioned Peace Enforcement mission, codenamed Operation Northern Guardian, in the fictional Middle Eastern country of Eldoria. The primary objectives for CHAMP during this operation are:

1. Airlift of equipment and supplies for humanitarian and military operations from Northlandia, a northern European country, to a Main Operating Base (MOB) in Eldoria.
2. Provide aerial refueling support to coalition aircraft.
3. Execute Medical Evacuation (MEDEVAC) of civilians and personnel from remote air bases.
4. Air drop of humanitarian aids and paratroopers.
5. Theater airlift of supplies, equipment, and personnel within the operational area.

The success criteria for the CHAMP's missions are outlined as follows:

1. Successful delivery of at least 95% of the airlifted equipment and supplies to the MOB on schedule.
2. Providing aerial refueling to at least 90% of the coalition aircraft in need, ensuring
operational continuity.
3. 100% successful MEDEVAC operations, ensuring the safety and well-being of evacuated individuals.
4. Successful air drop of humanitarian aids to the designated drop zones with a precision rate of 95%.
5. Efficient theater airlift operations, ensuring timely and secure transportation of personnel and materials.

3.2 Environment

3.2.1 Blue
In the Blue environment, the CHAMP collaborates with various systems and organizations. It operates under the Northlandia Air Force (NAF) and is a part of a larger coalition force sanctioned by the United Nations. The CHAMP liaises with the Eldorian Civil Aviation Authority (ECAA) for coordinated and safe operations within Eldoria's airspace. It also works closely with humanitarian organizations like the International Relief Agency (IRA) for the transportation and airdrop of aids. The CHAMP is integrated into the Coalition Air Command and Control System (CACCS) for effective communication and operational coordination.

3.2.2 Green
The CHAMP operates under stringent rules and regulations to ensure safety, security, and efficiency. It adheres to the International Civil Aviation Organization (ICAO) standards and recommended practices. The climatic conditions in Eldoria are characterized by arid and semi-arid landscapes, with temperatures soaring during the day and plummeting at night. The CHAMP is designed to operate efficiently under these harsh and varying climatic conditions, ensuring the reliability and safety of missions. Additionally, it complies with the environmental regulations set forth by the Eldorian Environmental Protection Agency (EEPA), minimizing the ecological footprint of its operations.

3.2.3 Red
The Red environment encapsulates the adversarial elements that the CHAMP may encounter. Eldoria is marred by conflicts, with insurgent groups and factions opposing the peace enforcement mission. The CHAMP faces threats from surface-to-air missiles, anti-aircraft artillery, and other forms of air defenses deployed by these groups. Operational planning and execution are tailored to mitigate these threats, ensuring the safety and security of the CHAMP and its missions.

4. Scenario Vignette 1: Operation Swift Delivery

4.1 Objectives and Success Criteria
The objective of Operation Swift Delivery is to execute a rapid and secure airlift operation to transport essential equipment, supplies, personnel, and vehicles to the Main Operating Base
(MOB) in Eldoria. The detailed objectives are:
1. Transport pallets of supplies, including food, medical supplies, and ammunition, ensuring they are delivered intact and on schedule.
2. Deliver crucial equipment such as electric generators and water treatment systems to facilitate the setup and operation of the MOB.
3. Safely transport personnel, ensuring their security and well-being throughout the journey.
4. Move vehicles, including armored personnel vehicles, ensuring they are operational upon arrival.

The success of Operation Swift Delivery is determined by the following criteria:
1. All pallets of supplies are delivered with less than 5% damage rate.
2. Equipment including electric generators and water treatment systems is operational and ready for immediate deployment upon arrival.
3. No casualties or serious injuries among the transported personnel.
4. Vehicles are delivered in operational condition, ready for immediate deployment.

4.2 Environment

4.2.1 Blue
During Operation Swift Delivery, the CHAMP works in unison with the Northlandia Air Force’s logistical and operational units. The Northlandian Military Logistics Command (NMLC) ensures the efficient loading and unloading of supplies, equipment, and vehicles. The Northlandia Air Traffic Control (NATC) coordinates the CHAMP’s flight, ensuring safe passage through Northlandia’s airspace. In Eldoria, the CHAMP coordinates with the Eldorian MOB Control Team for the safe and efficient offloading and storage of the airlifted assets.

4.2.2 Green
The CHAMP complies with stringent operational protocols to ensure the safety and security of the airlift mission. It operates under established international aviation standards, ensuring the safe transportation of personnel and cargo. Given the sensitive nature of the supplies, adherence to the Eldorian customs and import regulations is crucial. Weather conditions, characterized by strong winds and sandstorms in Eldoria, require meticulous planning and adaptive operational capabilities.

4.2.3 Red
Operation Swift Delivery faces potential threats from insurgent factions operating within and around Eldoria. The CHAMP is equipped with countermeasures to mitigate risks from surface-to-air missiles and anti-aircraft artillery. The flight path is strategically planned to avoid known hostile territories, and real-time intelligence is used to navigate away from emerging threats.
5. Scenario Vignette 2: Operation Soaring Support

5.1 Objectives and Success Criteria
Operation Soaring Support focuses on providing air-to-air refueling for coalition fixed and rotary wing aircraft over Eldoria. The detailed objectives are:
1. Ensure the readiness of the CHAMP for timely air-to-air refueling operations.
2. Successfully refuel coalition aircraft to extend their operational range and endurance.
3. Maintain the security and safety of the CHAMP and the receiving aircraft during the refueling process.
4. Enhance the operational capability of the coalition forces by minimizing the downtime of aircraft due to fuel constraints.

The success of Operation Soaring Support is evaluated based on the following criteria:
1. The CHAMP is ready and available for at least 95% of the scheduled refueling missions.
2. Successful refueling of coalition aircraft in mid-air with a success rate of 98%.
3. Zero incidents or accidents during the refueling process, ensuring the safety of all involved personnel and assets.
4. Increased operational tempo of coalition forces due to enhanced aircraft availability and endurance.

5.2 Environment

5.2.1 Blue
In Operation Soaring Support, the CHAMP interfaces with various coalition aircraft, such as the Falconer F16 multi-role fighter and the Guardian G28 utility helicopter. The Falconer F16, characterized by its speed and agility, requires precise and efficient refueling operations. In contrast, the Guardian G28, known for its stability and larger fuel capacity, allows for more flexible refueling procedures. The CHAMP's refueling system is adaptable to cater to the diverse fuel intake mechanisms and requirements of different aircraft. Coordination with the Coalition Air Operations Center (CAOC) ensures timely and efficient refueling missions, enhancing the overall operational capability.

5.2.2 Green
Operation Soaring Support adheres to stringent safety and operational standards. The mission often occurs at altitudes between 10,000 and 25,000 feet, depending on the receiving aircraft and weather conditions. The CHAMP is equipped with advanced navigation and communication systems to ensure safe and efficient operations even under adverse weather conditions. The mission is conducted in compliance with international aviation refueling standards, ensuring the safety of both the CHAMP and the receiving aircraft.

5.2.3 Red
The CHAMP faces potential threats from Eldorian insurgent groups equipped with portable anti-aircraft weapons. Real-time intelligence and surveillance are paramount to identify and
mitigate these threats. The CHAMP is equipped with electronic warfare and countermeasure systems to deter potential attacks. Flight paths are strategically planned, and dynamic re-routing is employed when necessary to avoid identified threats, ensuring the safety of the refueling mission.

6. Scenario Vignette 3: Operation Lifeline Haven

6.1 Objectives and Success Criteria
Operation Lifeline Haven aims to rapidly and safely evacuate civilians and coalition personnel, including the critically wounded, from a threatened remote airport in Eldoria to the safety of the Main Operating Base (MOB). The detailed objectives are:
1. Rapid deployment of the CHAMP to the designated remote airport for evacuation.
2. Safe evacuation of civilians and coalition personnel, prioritizing the critically wounded.
3. Provision of in-flight medical treatment to stabilize the wounded until arrival at the MOB.
4. Ensuring the security and safety of the evacuees and the CHAMP crew during the operation.

The success of Operation Lifeline Haven is determined by the following criteria:
1. The CHAMP is deployed and arrives at the remote airport within 2 hours of mission activation.
2. All designated civilians and personnel are safely evacuated with zero casualties during the operation.
3. Critically wounded individuals are stabilized in-flight, with all necessary medical procedures performed efficiently.
4. The CHAMP and evacuees safely reach the MOB, with the security of all individuals maintained throughout the operation.

6.2 Environment

6.2.1 Blue
In Operation Lifeline Haven, the CHAMP collaborates closely with the Eldorian Emergency Response Team (EERT) and the Coalition Medical Support Unit (CMSU). The EERT provides ground support, security, and initial medical aid at the remote airport. The CMSU, stationed at the MOB, prepares for the reception of evacuees, ensuring immediate medical attention upon arrival. The Coalition Air Operations Center (CAOC) ensures that the airspace is secure and provides real-time intelligence to the CHAMP for safe ingress and egress routes.

6.2.2 Green
The remote airport in Eldoria, characterized by its limited infrastructure and harsh environmental conditions, poses significant operational challenges. The airstrip is unpaved and surrounded by rugged terrain, requiring the CHAMP to have advanced takeoff and landing capabilities. The hot and arid climate, coupled with frequent sandstorms,
necessitates specialized equipment and protocols to ensure the safety and efficiency of the evacuation operation.

6.2.3 Red
The remote airport is located in a region with heightened insurgent activity, posing a significant threat to the MEDEVAC mission. The CHAMP is equipped with defensive countermeasures to mitigate the risk of surface-to-air attacks. The speed of the operation is crucial to minimize exposure to potential threats. Real-time intelligence and close coordination with ground forces are employed to ensure the safety of the evacuees and the CHAMP crew.

7. Scenario Vignette 4: Operation Mercy Drop

7.1 Objectives and Success Criteria
Operation Mercy Drop aims to deliver humanitarian aids to populations in need within Eldoria, with a focus on precision, safety, and speed. The detailed objectives are:
1. Prepare and load humanitarian aids, ensuring they are secure and ready for airdrop.
2. Navigate to the designated drop zones, often located in hostile or inaccessible areas.
3. Execute the airdrop with precision, ensuring that the aids reach the intended recipients.
4. Maintain the safety and security of the CHAMP and its crew during the operation.
5. Complete the mission within a specified timeframe to ensure the timely delivery of aids.

The success of Operation Mercy Drop is evaluated based on the following criteria:
1. At least 95% of the humanitarian aids are delivered intact and are recoverable upon landing.
2. The airdrop is executed with a precision rate of 90%, ensuring that the aids reach the designated drop zones.
3. Zero incidents or accidents involving the CHAMP and its crew during the operation.
4. The mission is completed within 6 hours from takeoff to return, ensuring the timely delivery of aids.

7.2 Environment

7.2.1 Blue
In Operation Mercy Drop, the CHAMP collaborates with the International Relief Agency (IRA) for the preparation and loading of humanitarian aids. The Coalition Air Operations Center (CAOC) provides the necessary intelligence and coordinates the airspace to ensure a safe and secure mission. The Eldorian Emergency Response Team (EERT) is alerted to facilitate the recovery and distribution of the airdropped aids on the ground.

7.2.2 Green
The mission is executed in areas characterized by difficult terrain and adverse weather conditions. The drop zones are often located in mountainous regions or conflict zones, requiring precise navigation and airdrop capabilities. The CHAMP is equipped with
advanced navigation systems and weather radars to navigate these challenges effectively. The operation adheres to international humanitarian and aviation standards to ensure the safety and effectiveness of the airdrop.

7.2.3 Red

Given the hostile environment in certain regions of Eldoria, the CHAMP faces potential threats from insurgent groups. The aircraft is equipped with defensive countermeasures to mitigate the risk of anti-aircraft fire and missile attacks. Real-time intelligence is crucial to navigate away from threats and ensure the safety of the mission. The speed and altitude of the airdrop are optimized to minimize exposure to potential threats.

2. Scope

2.1 Background and Purpose

This document outlines a series of operational scenarios to present the problem-space for the Combat and Humanitarian Airlift Multi-role Platform (CHAMP). The scenarios are designed to explore and articulate the diverse and complex operational requirements, environmental conditions, and challenges that CHAMP is expected to navigate. The purpose of delineating these scenarios is to inform the design, development, and evaluation of the CHAMP system, ensuring it is equipped to perform optimally in real-world operations, both in combat and humanitarian contexts.

2.2 Method

The development of the scenarios involved a systematic review of the envisioned operational domains, tasks, and challenges for the CHAMP system. The Ontology, provided as a foundational framework, guided the identification and articulation of key operational objectives, environmental conditions, and success criteria. Each scenario vignette is meticulously crafted, drawing insights from the ontology, to encapsulate specific operational facets of CHAMP, ensuring a comprehensive exploration of its anticipated roles and responsibilities.

2.3 Constraints and Limitations

While every effort has been made to ensure the comprehensiveness and realism of the scenarios, certain constraints and limitations exist. The scenarios are hypothetical constructs and, as such, may not encapsulate all possible real-world operational nuances and unpredictabilities. The ontology, although robust, is not exhaustive and may not cover all potential operational, environmental, and adversarial variables. Moreover, the scenarios are based on assumptions and are constrained by the lack of real-world data and evolving operational doctrines that could influence the CHAMP’s operational parameters and performance.

2.4 Document Outline
The document is structured to provide readers with a comprehensive view of the CHAMP’s operational scenarios. Section 1 offers a summary of the key points. Section 2, the current section, outlines the scope, including the background, method, constraints, and structure of the document. Section 3 presents the overall scenario, delineating the general operational context and environment for CHAMP. Sections 4 to 7 detail individual scenario vignettes, each focusing on a specific operational task, providing insights into the objectives, success criteria, and environmental conditions associated with each task. Each vignette builds on the general scenario, offering a focused and detailed examination of CHAMP’s operational capabilities and challenges.