



### Bionic Fusion Strand Design: Autonomous Land Scout Vehicle

## Bionic UX Design with Fusion Strands

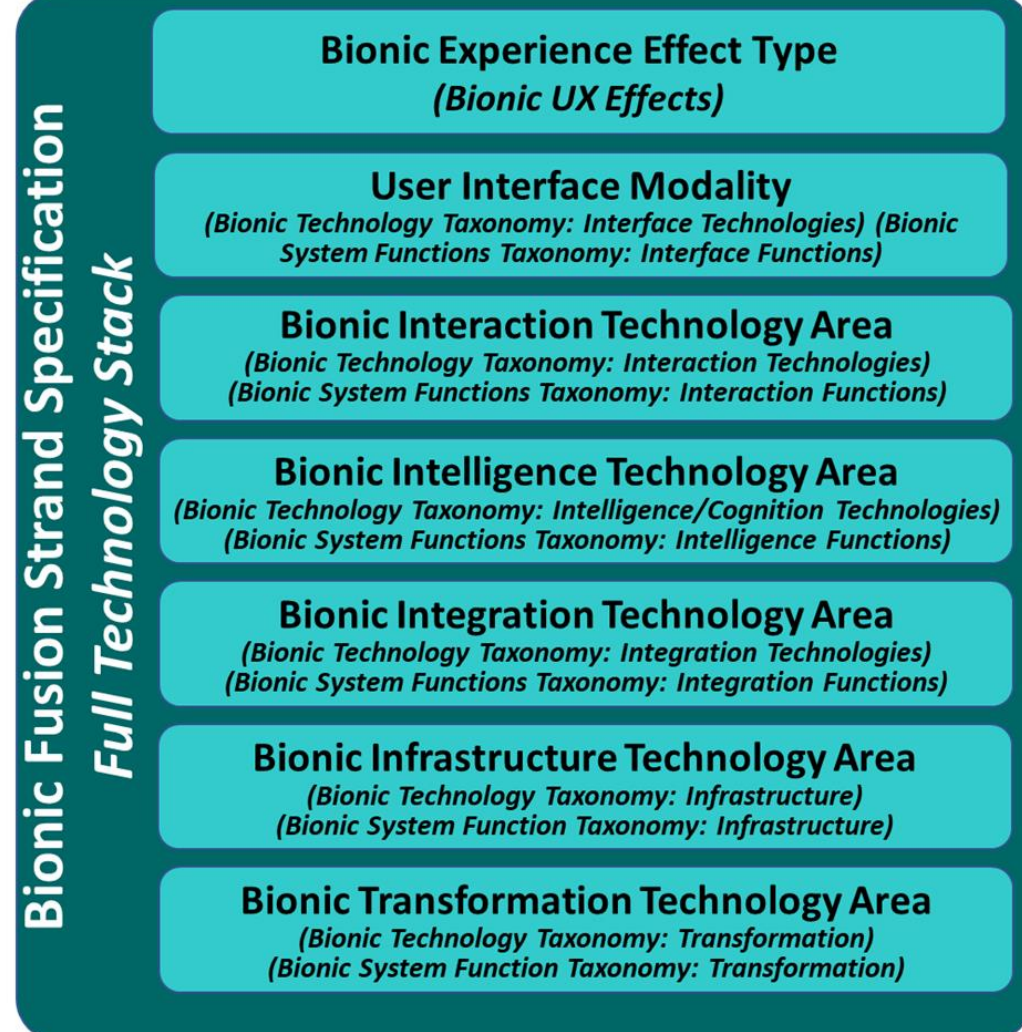
**Value Stream:** Autonomous Land Scout Vehicle that can navigate, sense, categorize, target, inform, assess, and execute autonomous surveillance missions and achieve surveillance goals.

#### User Journey(s)



<b>User Motivation</b>	- specific motivation or driver for why the user wants to engage in a UX interaction: <i>As a task force commander I want to conduct surveillance operations without allocating valuable human assets.</i>
<b>User Objective</b>	- specific user experience objective of the user: <i>As a task force commander, I want the ability to specify in plain English, surveillance, detection, classification, assessment objectives to be carried out autonomously and report back as triggers occur so that I may adjust mission tasks.</i>
<b>User Expectation</b>	- specific outcome, effect, result the user is seeking/desiring: <i>I want the autonomous intelligence gathering to identify specified and unspecified events/subjects of interest that it determines might impact the larger mission – and to provide tactical intelligence and recommendations.</i>
<b>User Task/Step/Action</b>	- specific action a user is attempting to accomplish: <i>Task= Conduct Autonomous Surveillance, Task=Identify Subjects/Events of Interest with potential to impact the task force mission. Task= Provide intelligence assessments/recommendations based on understanding of mission objectives and potential impacts of surveilled events/subjects.</i>

User Persona Model



## Land Scout Vehicle Fusion Strand Narrative

In this use case, we will explore how bionic effects, empowered by AI/ML capabilities and robotic technologies, can improve the capabilities and effectiveness of an autonomous land scout vehicle used for intelligence, surveillance, and reconnaissance (ISR). These technologies enhance the vehicle's ability to gather and analyze information for various scenarios. In the context of an autonomous land scout vehicle for intelligence, surveillance, and reconnaissance, AI/ML capabilities and robotic technologies enhance the vehicle's capabilities to gather, analyze, and act upon critical information. These technologies contribute to improved situational awareness, mission success, and overall operational effectiveness.

Bionic Effects	
<b>Capability Area 1: Interface</b>	<b>Immersion:</b> - Description: Creating immersive operator interfaces that allow remote operators to virtually navigate the vehicle's environment. - Bloom's Taxonomy Level: Application - Verbs: Navigating, Exploring, Interacting - AI/ML Capabilities: Remote Exploration (prescriptive), Immersive Interface (prescriptive) - AI/ML Methods: Remote Control Systems (remote exploration), Virtual Reality (immersive interface)
<b>Capability Area 1: Interface</b>	<b>Empathizing:</b> - Description: Analyzing visual and audio data to identify potential threats or anomalies in the vehicle's surroundings. - Bloom's Taxonomy Level: Application - Verbs: Analyzing, Detecting, Identifying - AI/ML Capabilities: Threat Detection (prescriptive), Anomaly Recognition (prescriptive) - AI/ML Methods: Object Detection (threat detection), Audio Analysis (anomaly recognition)
<b>Capability Area 1: Interface</b>	<b>Partial Task Automation (mechanical, digital/cognitive):</b> - Description: Automating routine data collection and analysis tasks to reduce operator workload. - Bloom's Taxonomy Level: Application - Verbs: Automating, Analyzing, Monitoring - AI/ML Capabilities: Data Processing Automation (prescriptive), Surveillance Analysis (prescriptive) - AI/ML Methods: Data Processing Algorithms (data processing automation), Pattern Recognition (surveillance analysis)
<b>Capability Area 2: Interface</b>	<b>Mentoring:</b> - Description: Enabling AI-assisted decision-making by providing recommendations based on real-time data analysis. - Bloom's Taxonomy Level: Application - Verbs: Assisting, Advising, Recommending - AI/ML Capabilities: Decision Support (prescriptive), Real-time Analysis (prescriptive) - AI/ML Methods: Expert Systems (decision support), Real-time Analytics (real-time analysis)
<b>Capability Area 1: Interface</b>	<b>Task Precision:</b> - Description: Increasing the precision of location tracking and mapping using AI-enabled sensor fusion. - Bloom's Taxonomy Level: Application - Verbs: Increasing, Tracking, Mapping - AI/ML Capabilities: Sensor Fusion (prescriptive), Precision Location (prescriptive) - AI/ML Methods: Sensor Data Integration (sensor fusion), Localization Algorithms (precision location)
<b>Capability Area 1: Interface</b>	<b>Stealth and Camouflage:</b> - Description: Utilizing adaptive camouflage technology to enhance vehicle concealment in various environments. - Bloom's Taxonomy Level: Synthesis - Verbs: Utilizing, Concealing, Adapting - AI/ML Capabilities: Adaptive Camouflage (prescriptive), Environmental Analysis (prescriptive) - AI/ML Methods: Computer Vision (adaptive camouflage), Environmental Sensors (environmental analysis)
<b>Capability Area 1: Interface</b>	<b>Environmental Sensing and Analysis:</b> - Description: Integrating AI-powered environmental sensors to gather and analyze data for mission success. - Bloom's Taxonomy Level: Application - Verbs: Integrating, Gathering, Analyzing - AI/ML Capabilities: Environmental Sensing (prescriptive), Data Analysis (prescriptive) - AI/ML Methods: Sensor Integration (environmental sensing), Data Analytics (data analysis)
<b>Capability Area 2: Intelligence</b>	<b>Task Acceleration:</b> - Description: Accelerating data analysis and information extraction through AI-driven algorithms. - Bloom's Taxonomy Level: Application - Verbs: Accelerating, Extracting, Analyzing - AI/ML Capabilities: Rapid Analysis (prescriptive), Information Extraction (prescriptive) - AI/ML Methods: Real-time Analytics (rapid analysis), Natural Language Processing (information extraction)
<b>Capability Area 2: Intelligence</b>	<b>Task Accuracy:</b> - Description: Enhancing target identification accuracy using AI-powered image recognition and classification. - Bloom's Taxonomy Level: Application - Verbs: Enhancing, Identifying, Classifying - AI/ML Capabilities: Target Recognition (prescriptive), Image Classification (prescriptive) - AI/ML Methods: Image Recognition Algorithms (target recognition), Deep Learning (image classification)
<b>Capability Area 1: Interface</b>	<b>Sensory Augmentation:</b> - Description: Augmenting the vehicle's sensors to provide a more comprehensive view of the reconnaissance area. - Bloom's Taxonomy Level: Application - Verbs: Augmenting, Enhancing, Sensing - AI/ML Techniques: Sensor Fusion for multi-modal data integration, AI-driven Vision Systems for enhanced target detection.
<b>Capability Area 2: Intelligence</b>	<b>Collaborating:</b> - Description: Allowing multiple autonomous vehicles to collaborate on data collection and coordinated actions. - Bloom's Taxonomy Level: Application - Verbs: Collaborating, Coordinating, Collecting - AI/ML Capabilities: Multi-Vehicle Coordination (prescriptive), Data Sharing (prescriptive) - AI/ML Methods: Multi-Agent Systems (multi-vehicle coordination), Data Fusion (data sharing)
<b>Capability Area 2: Intelligence</b>	<b>Informational: Decision Support:</b> - Description: Providing real-time analysis of collected data to aid in situational awareness and decision-making. - Bloom's Taxonomy Level: Application - Verbs: Analyzing, Supporting, Informing - AI/ML Capabilities: Situational Analysis (prescriptive), Decision Aid (prescriptive) - AI/ML Methods: Data Analytics (situational analysis), Contextual Analysis (decision aid)
<b>Capability Area 2: Intelligence</b>	<b>Task Elasticity and Scalability:</b> - Description: Adapting mission parameters and data collection strategies based on changing operational requirements. - Bloom's Taxonomy Level: Synthesis - Verbs: Adapting, Scaling, Modifying - AI/ML Capabilities: Mission Adaptation (prescriptive), Dynamic Planning (prescriptive) - AI/ML Methods: Reinforcement Learning (mission adaptation), Dynamic Decision-making (dynamic planning)
<b>Capability Area 3: Integration</b>	<b>Physical Enhancement:</b> - Description: Enhancing the vehicle's physical capabilities and resilience for improved reconnaissance performance. - Bloom's Taxonomy Level: Application - Verbs: Enhancing, Strengthening, Improving - AI/ML Techniques: Robust Sensor Protection for durable data collection, Robotic Arm for autonomous payload manipulation.
<b>Capability Area 3: Integration</b>	<b>Full Task Automation and Autonomous Operation:</b> - Description: Implementing AI-driven autonomous mission execution for intelligence gathering and reconnaissance. - Bloom's Taxonomy Level: Synthesis - Verbs: Executing, Operating, Automating - AI/ML Capabilities: Autonomous Operation (prescriptive), Mission Execution (prescriptive) - AI/ML Methods: Reinforcement Learning (autonomous operation), Path Planning Algorithms (mission execution)
<b>Capability Area 2: Intelligence</b>	<b>Task Augmentation:</b> - Description: Augmenting vehicle capabilities by integrating AI-enabled threat assessment and predictive modeling. - Bloom's Taxonomy Level: Synthesis - Verbs: Augmenting, Enhancing, Predicting - AI/ML Capabilities: Threat Assessment (prescriptive), Predictive Modeling (prescriptive) - AI/ML Methods: Threat Analysis (threat assessment), Predictive Analytics (predictive modeling)

#### Bionic UX Effects

- Mentoring
- Collaboration
- Empathizing
- Partial Task Automation
- Task Acceleration
- Immersion (UX/VR/AR)
- Task Augmentation
- Task Elasticity & Scalability
- Task Autonomy
- Task Precision
- Task Accuracy
- Decision Support