DAEDALEAN

APPLIED INTELLIGENCE

Daedalean's Roadmap 2028

Situational Awareness

for Co-piloting and Autonomous Flight Control

Daedalean is building autonomous piloting software systems for civil aircraft of today and advanced aerial mobility of tomorrow. Starting with computer vision, we created a situational awareness system based on machine learning technology that can recognize, categorize and interpret the sensor input in real operational scenarios.

In this whitepaper, we describe our outlook for the next developments on several dimensions:

Product: from basic pilot assistance to advanced pilot assistance to monitored autonomy.

Capabilities: consecutive addition of sensors beyond visual spectrum (infrared, radar) and other information sources to expand operational conditions to nighttime/ degraded visual conditions and instrument flight rules.

Functions: advancing toward full situational awareness, including ground hazards and weather, adding hazard avoidance and risk management, extending to shared awareness (vehicle-to-vehicle communication) and shared risk management.

Contents

3. Introduction

7. Human/Machine Interface and levels of autonomy

8. Functional roadmap

- Positioning
- Runway/Helipad recognition
- Coarse Terrain Awareness
- Ground Obstacle Awareness
- Landing Safety
- Debris/Tail Hazards
- Traffic Awareness
- Weather Awareness
- Ground Collision Avoidance
- Traffic Collision Avoidance
- Regular Landing Guidance
- Emergency/Unplanned Landing Guidance
- Follow Waypoint/Return To Base Guidance
- V2V Shared Risk Awareness
- V2V Shared Intention Awareness

14. System roadmap

16. Appendix: Operational Conditions and Sensing modes

Introduction

1. Background

Daedalean develops onboard systems for situational awareness: software that can understand input from sensors and provide information to the flight control (autopilot or human pilot).

Currently, such systems are on the way to certification as pilot aid for General Aviation (DAL-C). They provide positioning, traffic detection, and landing guidance. Eventually, they will be developed to become a fully autonomous flight control system (up to DAL-A).

The first implementation of our technologies is based on computer vision: the system (we call it **VXS for "visual everything system"**) relies only on the input from visual cameras, which makes it suitable for Visual Meteorological Conditions (VMC). Working on that, we solved the two tasks that were the hardest: first, to create the machine learning (ML)-based technology able to recognize, categorize and interpret the sensor input at the distances, velocities, and uncertainties of the real flight, working in a computing box of reasonable size, weight, and power consumption. Second, to establish the principles on which such technology can be certified, working side by side with the regulators on developing design assurance methods for it.

Examples of VXS at work, outputting the visual traffic detection information and visual landing guidance information on Daedalean's tablet app

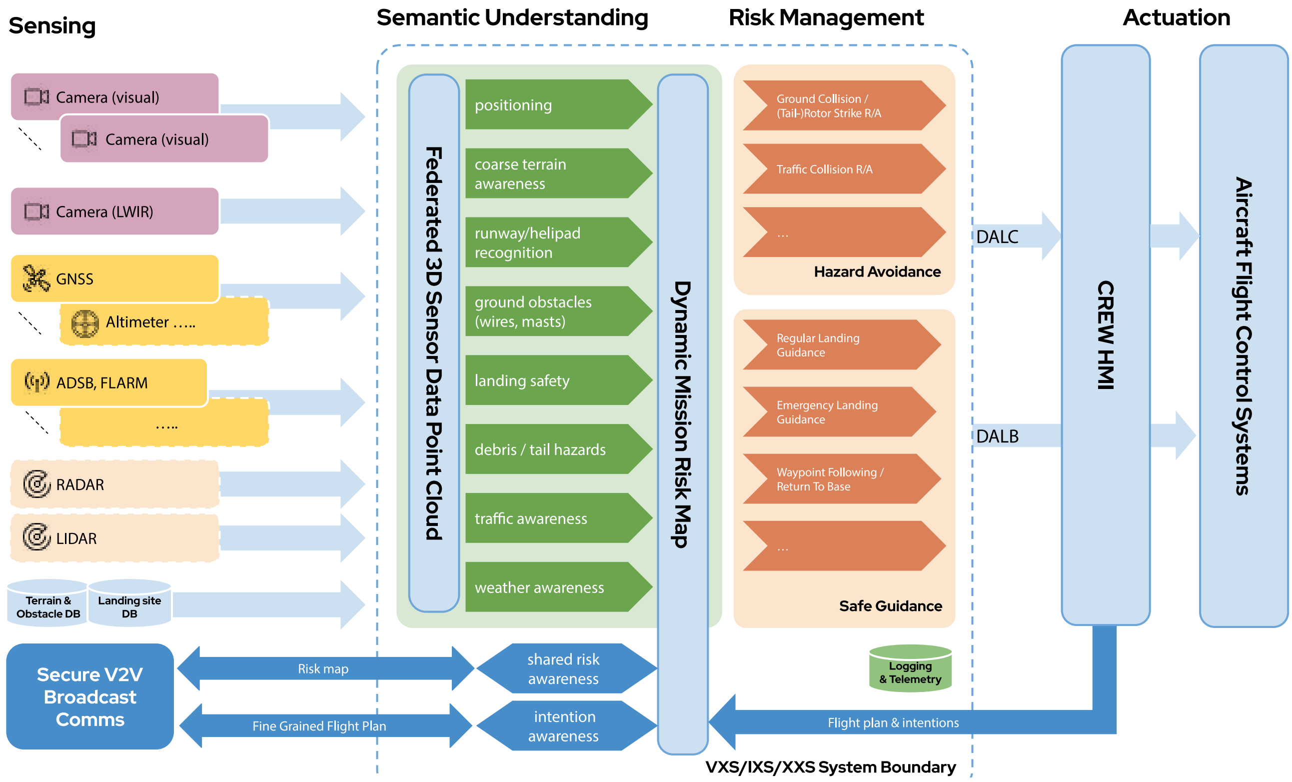
In 2023, in collaboration with partner Avidyne, we are launching PilotEye™, the first ML-based onboard pilot aid for General Aviation, incorporating Daedalean's visual traffic detection software. The STC application is submitted, and certification is in progress with the Federal Aviation Agency (FAA), with concurrent validation by European Union Aviation Safety Agency (EASA). It will be the world's first certified application for a safety-critical use case for civil aviation – at Level 1 AI/ML (human assistance/augmentation) according to the EASA AI Roadmap (see below) and up to DAL-C according to DO-178C.

2. Goals

After achieving the goals named above, we can add other existing sensors and situational awareness sources to the suite, creating the next generation of the product.

This whitepaper gives an outlook on this full-sensor product and its functional capabilities.

Our roadmap is split out along the following dimensions: Function, Operational Conditions, Human-Machine Interface, Hardware, and TRL/ Certification.

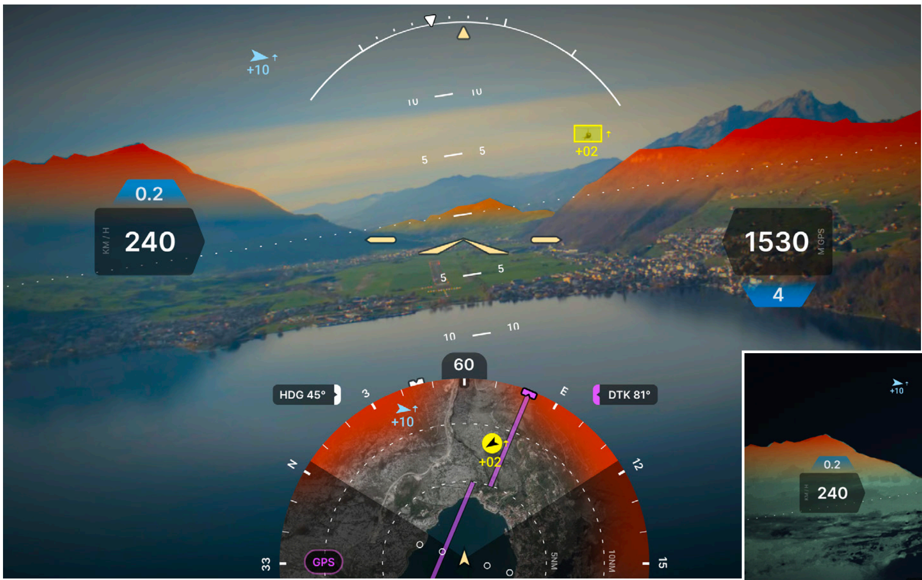


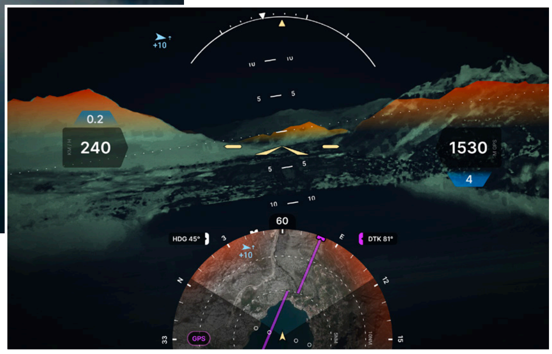
Daedalean VXS/IXS/XXS full functional concept architecture

The roadmap includes two further stages of development past the VXS. First, the **IXS ("Instrument Everything System"** – current working title) will embrace cameras (visual and LWIR), traditional instruments like GPS, altimeters, optionally lidars and radars, as well as other traffic information sources like ADSB-IN and FLARM, to function in a temporary Degraded Visual Environment (DVE) towards Instrument Meteorological Conditions (IMC).

Daedalean's IXS will provide fully certified terrain and traffic collision avoidance, as well as landing guidance and flight plan following capabilities, in VMC and IMC, certified to appropriate levels to function with minimal crew oversight only (EASA Level 3).

The system constructs a complete representation of the aircraft's environment during the entire mission and fuses the information from all available sensors into a single earth-referenced 3D map tagged with semantic information about the expected behaviour of all recognized objects.





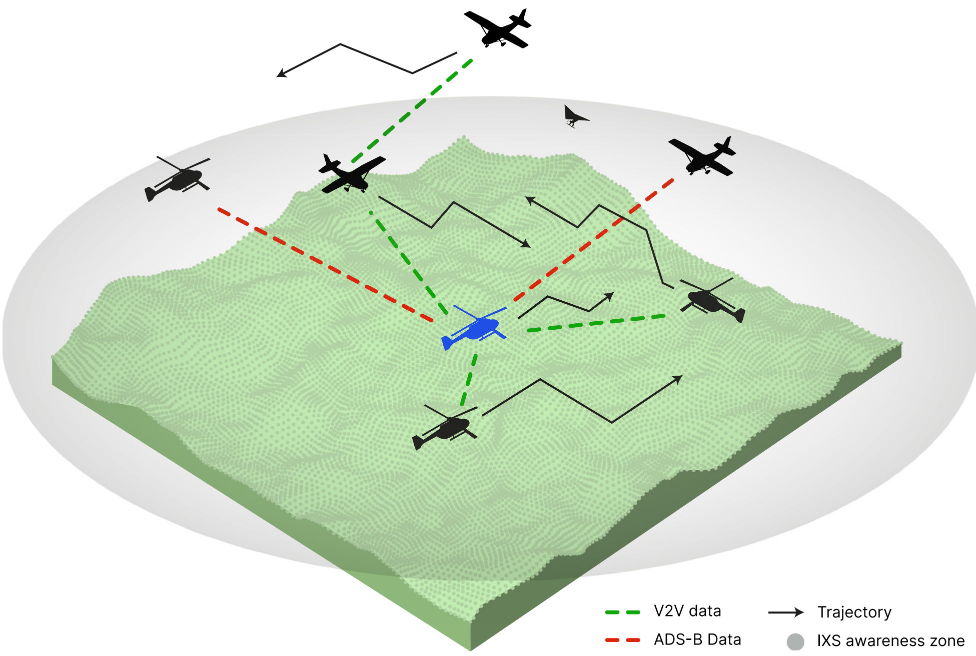
Conceptual view of a primary flight display with risk advisory, traffic collision, and landing guidance (daylight and night vision versions)

The XXS, a further enhancement of IXS, adds V2V communication. Trusted cooperating aircraft will be able to share their semantically augmented maps and their near-term flight plans to coordinate safe guidance and avoidance of hazard.

Many efforts are underway to standardize future "UAM/UTM" airspace management functions that may have a V2V component. Worldwide efforts to come to such standards have been ongoing since the 1980s or perhaps longer and show few signs of converging. Daedalean has no intention of waiting until some standard has settled. We are designing the XXS as a proprietary V2V communication protocol that can be proposed as a market standard after introduction.

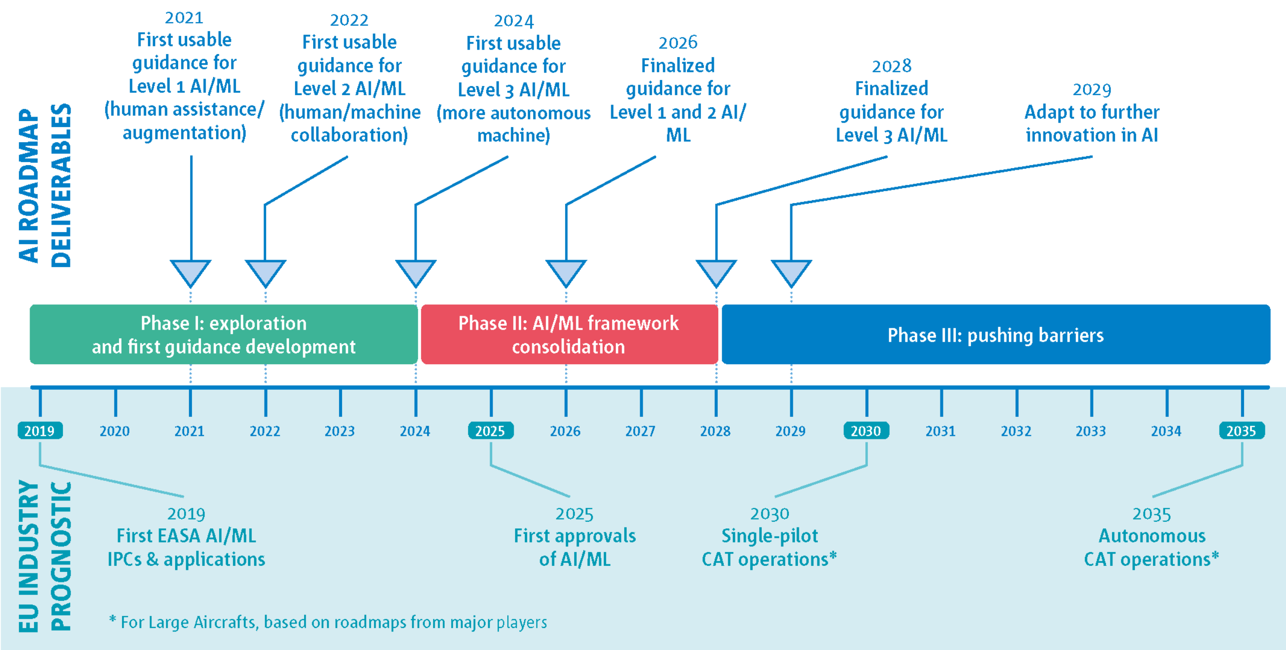
Even without the participation of other parties, Daedalean's customers can benefit from improved collaborative airspace safety.

V2V communications between the parties sharing situational awareness while flying around ADS-B cooperative and non-cooperative traffic



3. Certification

In 2020, European Union Aviation Safety Agency (EASA) published its AI Roadmap, which formulated and formalized the stages of accepting ML applications for certification, with the first approvals planned within the next 5 years. The period until 2024 is labeled as exploratory, then follows the period of 2024-2028, 'for consolidated rulings'.



Source: [EASA AI roadmap](), published 2020-02-07

For several years, Daedalean has been closely collaborating with aviation regulatory agencies, assisting them in establishing how AI/ML can be introduced into avionics and how to adapt regulations accordingly. Two joint reports with EASA discussed how classical SW/HW certifications could be adapted for ML in safety-critical settings. This groundbreaking work was recognized in EASA's first AI guidance.

The FAA has performed a joint research project with Daedalean on neural network-based runway landing. The research results may inform the future organization's policy on AI/ML.

After certifying the first visual systems (starting from PilotEye), we plan to fuse all the other (non-visual) sensors. In the resulting product, vision-based AI technologies will be combined with other data sources and merged onto a single intuitive display, extending beyond daytime VMC. At the same time, we will simultaneously work to apply for certification to DAL-B to enable functions on the EASA AI Roadmap Level II: human/machine collaboration (autonomous flights with human supervision).

The next step is transition to fully autonomous mode, with only minimal crew oversight, optionally remote. To be able to apply for the certification at this level, we expect the regulators to demand accruing several years and several thousands of flight- and service hours. The hardware and software will already meet the safety and reliability requirements and will not have to be changed.

Human/Machine Interface and levels of autonomy

The output of the Semantic Awareness functions and the guidance functions can be presented to the crew or fed to the flight control systems as primary (guidance) or auxiliary (safety/envelope constraints) input. EASA's AI roadmap distinguishes levels 1 to 3, from mere crew assistance to more or less full autonomy. While the technology may become ready, the regulator will not be considering certification for fully autonomous function until years and thousands of flight hours of experience and service history have been built. When this happens, the certification package can be upgraded without actually upgrading the hard and software of the system.

Pilots today face the risk of information overload amid a cockpit full of instruments that demand attention. Daedalean sees a next-generation instrument not as one providing more sets of signals for the Pilot to sift through but as one that can take over situational awareness and risk management tasks, like a trustworthy electronic copilot.

1. Basic Pilot Assistance (level 1)

Daedalean proposes a roadmap where the awareness and guidance functions are first displayed on existing instruments with similar functionality. E.g., the positioning, terrain, and traffic awareness may be displayed on existing live map interfaces, and guidance away from danger or towards safety (landing) may be presented on a flight director interface. An existing multifunction display can be used to show relevant views from the underlying data.

Today's certified MFDs lack adequate resolution and/or size but most prominently processing capacity to display video data adequately, making the retrofit use case hard.

For these use cases, however, the MFDs can be augmented with limited visual data – for example, a traffic/obstacle thumbnail for obstacle detection (which will be offered with the PilotEye system) or a runway thumbnail for the landing. Alternatively, a non-certified tablet display with more visual data can be used to provide further visual guidance and expand the pilot's understanding and perception.

2. Advanced Pilot Assistance (level 2)

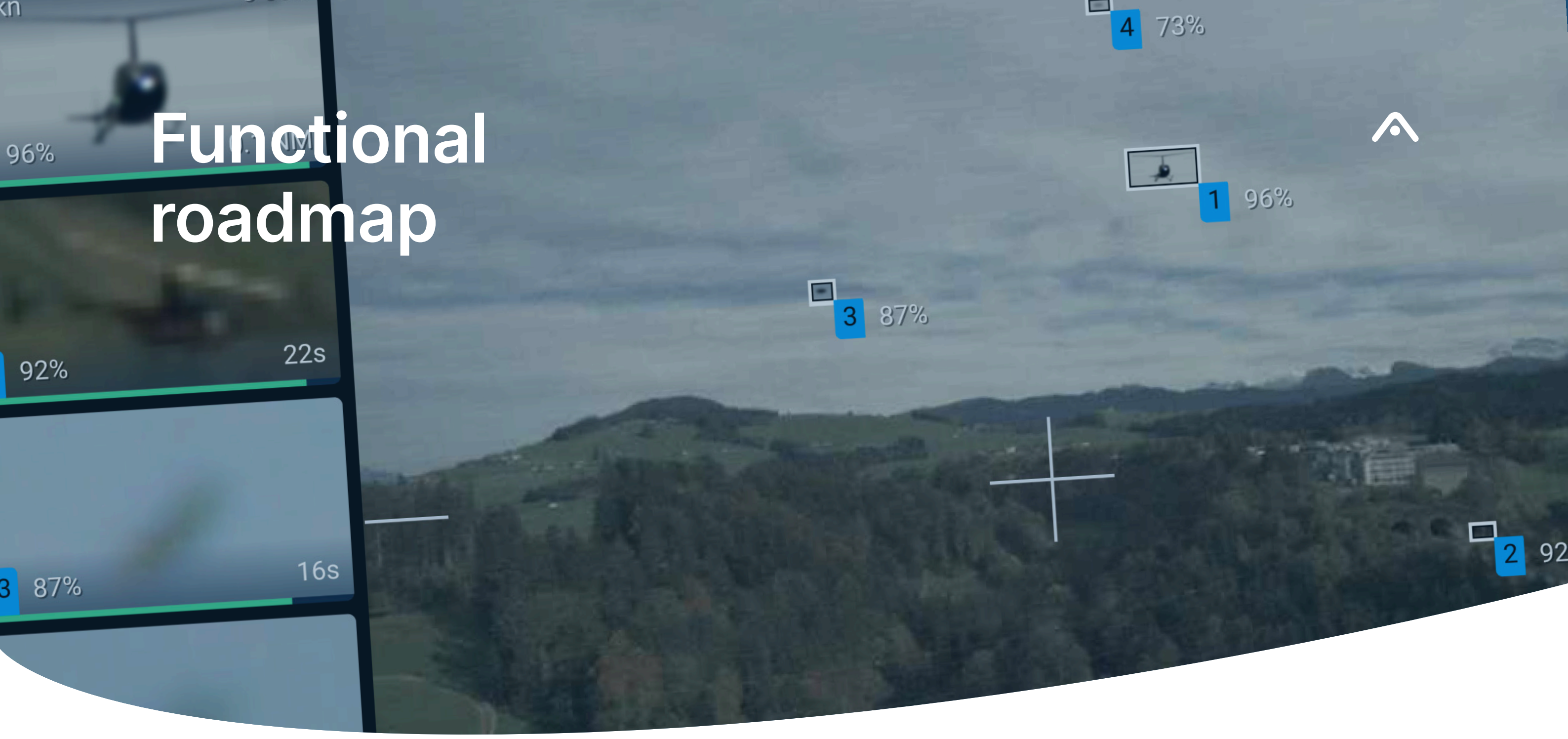
EASA' AI Roadmap describes Level 2 AI/ML as "human/machine collaboration". The next-generation product is to step up from an assistance tool that just adds more information to be displayed to a pilot, together with all the information present now on classical displays. This system takes the role of a full-fledged co-pilot who monitors the aircraft's condition, the surrounding environment, and the pilot.

Its essential function is to blend all the information from all the possible sources and relieve the pilot of the need to perceive lots of indicators with unrelated and often irrelevant at the specific moment data. The AI co-pilot sustains the persistent Dynamic Mission Risk Map during the route. At each moment of the flight, it brings to the pilot's attention only necessary and relevant information: the next hazards and immediate issues. It offers the required actions, maneuvers, or alternative routes and provides the related data – indicators of aircraft position, velocity, or performance.

At this level, one intuitive display providing a 3-D situational map replaces the numerous instrumentation on the cockpit panel. But the primary interaction between a human and a machine is carried out through two-way voice communication. Voice messages from the system deliver crucial information to the pilot at the moment when it is needed. To be an optimal co-pilot, the system will monitor the pilot's voice, actions, and possible eye movement, in the way currently found in advanced driver assistance systems. This way, the system can help manage the most scarce resource: the pilot's attention.

3. Monitored Autonomy (level 3)

Once the output of the system is fed directly to the flight control systems, the role of the crew changes to one of oversight, and this display becomes the monitor through which the system informs the crew of its intentions, together with the underlying data that drove these decisions.



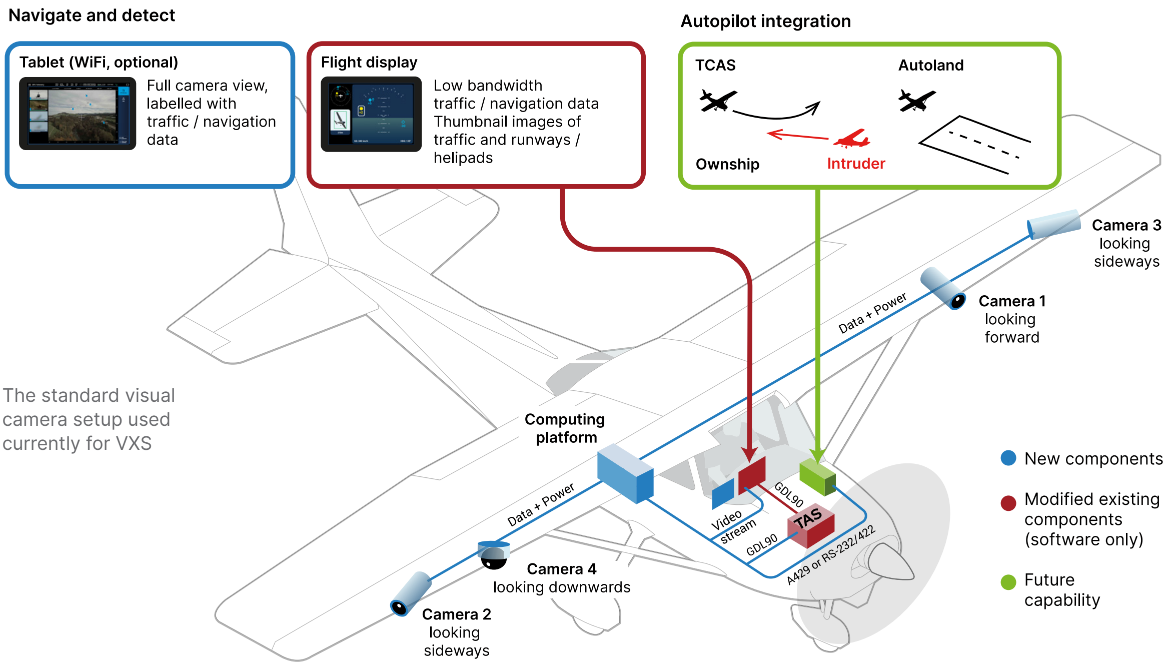
Functional roadmap

IXS provides a basic group of awareness functions – detection of hazards and understanding of safety. The advanced group of functions, namely Resolution Advisories and automated guidance, is to be built on top of that.

These basic functions all use visual cameras as a basis, optionally augmented with LWIR cameras, radar, and lidar where possible and practical. The system architecture is aircraft-agnostic: it can be applied to a helicopter, a fixed-wing, or Advanced Aerial Mobility (e)VTOL aircraft with minor modifications.

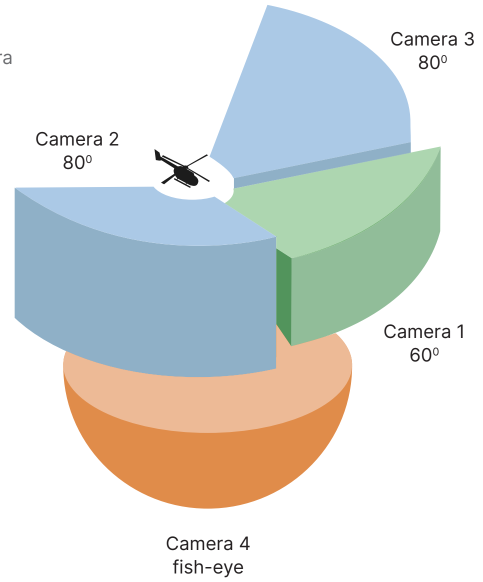
Current state (VXS): visual-based functions

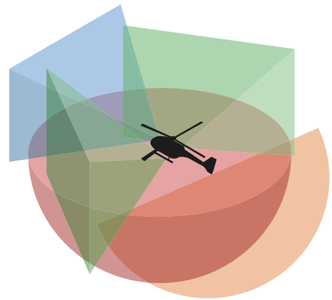
The visual-only functions – subsystems of VXS working today at TRL6 – providing Positioning, Runway/Helipad Recognition, Coarse Terrain Awareness, Traffic Detection, and Landing Safety are demonstrating the highest accuracy in VMC.



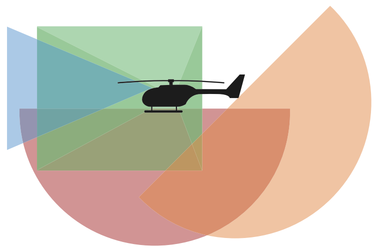
The standard visual camera setup used currently for VXS

Standard camera setup – VXS





3D view



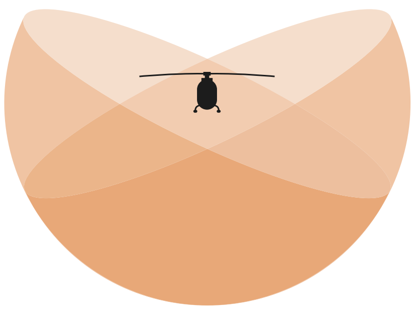
Side view

Positioning is based on a single downward-facing fisheye camera that covers the downward half-sphere. The positioning algorithms are SLAM and Visual Odometry, supplemented with global landmark recognition based on a processed satellite image database or observations from the **Coarse Terrain Awareness** subsystem, which can densely reconstruct the 3D landscape at an accuracy of 10 m in the far-field. This map is updated in real time during a mission. Existing terrain databases can be used to initialize the map before observations update it to the current state (e.g., HTAWS).

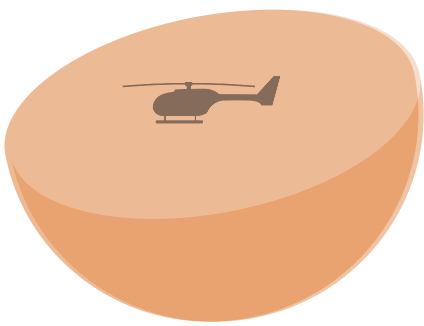
The performance metrics based on the use of a single fisheye camera in cruise flight can be found in the Positioning and Landing product factsheet.

The Coarse Terrain Awareness function also uses the feed from the downward-looking fisheye camera or cameras.

Custom camera setup – 2 fisheye cameras in the visible light spectrum



Front view



Side view

The subsystem of the positioning system is **Runway/ Helipad Recognition**. This function can identify runways, helipads, and any particular landmark from a database with an image and a rough position and provide refined positioning information with respect to these objects for use in landing guidance.

Forward-looking cameras 1, 2, and 3 of the standard VXS setup shown above are used for runway detection. Cameras 2 & 3 (66° V x 80° H) are looking to the sides, and camera 1 is looking straight on (46° V x 60° H). Fisheye camera 4 is used for helipad recognition.

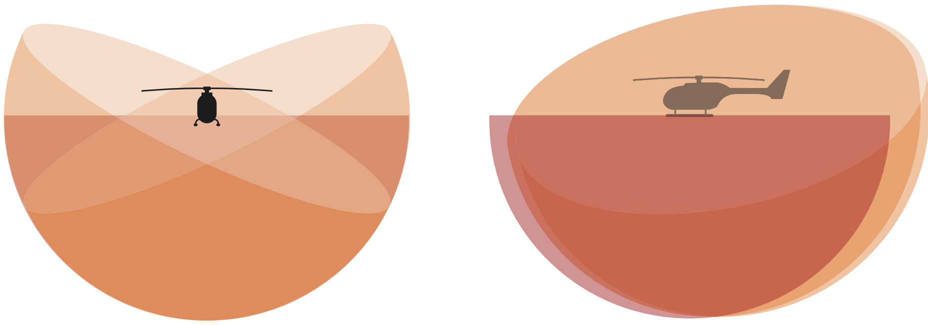
The basic performance of the visual landing guidance subsystem of VXS can be found in the [Positioning and Landing product factsheet].

Visual traffic detection uses forward-looking cameras 1, 2, and 3 from the standard setup above to detect all types of intruders. The detection range (Declaration Range as per DO-387) depends on the type and size of the intruder. The typical performance above the horizon can be found in the [Visual Traffic Detection factsheet].

Outlook: sensors and functions

Below, we provide an overview of the subsequent development of these basic awareness functions on the way from VXS to IXS, describing our evaluation of how the addition of other sensors can influence their capabilities. The functions relying on the input from downward-looking fisheye cameras can be enhanced by adding Long Wavelength Infrared (LWIR) cameras.

Custom camera setup – 2 fisheye cameras in the visible light spectrum (orange) and 1 fisheye LWIR camera (red)



Front view

Side view

Here is how our roadmap is structured in relation to the sensing modalities and the resulting possible operational conditions.

Sensing Modality	Operational Conditions	Functions	System
Electro-Optical (EO)	Daytime/Nighttime VMC, limited DVE	All functions	VXS/IXS/XXS
LWIR	DVE, IMC	Positioning, Coarse Terrain, Ground Obstacle, Landing Safe-ty, Ground Collision, Regular Landing, Emergency Landing, FollowPath/RTB	IXS/XXS
Lidar	Daytime/Nighttime VMC, DVE, IMC	Positioning (near), Coarse Terrain (near), Ground Obstacle (near)	optional extension
Radar	Daytime/Nighttime VMC, DVE, IMC	Positioning (far), Coarse Terrain (far), Ground Obstacle (far), Traffic Awareness	optional extension

As a next step, building advanced group of functions, namely Resolution Advisories and automated guidance, includes the development of the intelligent software beyond the current capabilities of the semantic understanding implemented in our current situational awareness system.

Finally, we describe the conceptual vision for the functions planned for the most advanced state of the system – the product that we call XXS. These functions are based on vehicle-to-vehicle communication: V2V Shared Risk Awareness and V2V Shared Intention Awareness.

Functional roadmap

Awareness functions (IXS/XXS)

- Positioning
- Runway/Helipad Recognition
- Coarse Terrain Awareness
- Ground Obstacle Awareness
- Landing Safety
- Debris/Tail Hazards
- Traffic Awareness
- Weather Awareness

Resolution Advisories and automated guidance functions

- Ground Collision Avoidance
- Traffic Collision Avoidance
- Regular Landing Guidance
- Emergency/Unplanned Landing Guidance
- Follow Waypoint/Return To Base Guidance

Vehicle to vehicle communication functions

- V2V Shared Risk Awareness
- V2V Shared Intention Awareness

Awareness functions (IXS/XXS)

Positioning

By fusing visual and LWIR cameras with GNSS, this function can accurately determine the position and pose (roll/pitch/yaw) in the world, even when GNSS is unavailable or unreliable.

Our evaluation has shown that the same algorithms work well with an LWIR camera but with a degraded accuracy. Integrating a mechanically rotating lidar has proven to be straightforward. Still, a mature application will require a sufficiently powerful lidar without moving parts, which are becoming available only now (see Appendix).

The addition of radar is likely to improve the accuracy of the height above ground estimates at heights typical for cruise flight.

The addition of lidar will improve the accuracy of the position and height AGL outputs below 200m AGL (provided the beam extends sufficiently downwards) and the attitude / heading performance. It will have a negligible effect above 200m.

Debris/Tail Hazards

An extension of the ground obstacle and landing safety functions can identify moving debris over time to identify tail rotor hazards. This function uses the feed from the downward-looking fisheye cameras that are angled in order to monitor the tail rotor.

Runway/Helipad Recognition

This function works primarily on visual imagery. Lidar and radar are not expected to provide added benefits (over any benefits to the base positioning algorithm).

Landing Safety

The Landing Safety function applies semantic segmentation to distinguish buildings, high and low vegetation, vehicles, cattle, and other relevant categories to determine incursions on helipads and runways and to determine the best emergency landing site in sight at all times. This function uses the feed from the downward-looking fisheye cameras.

Coarse Terrain Awareness

The landmark recognition works primarily from Visual and LWIR cameras. These sensor modalities can optionally be augmented with lidar for the near field and radar for the far field.

(Industry standard) Jeppesen – 30 arc-second NOAA Globe database	VXS	Lidar/radar augmented
Up to 900 m resolution	Up to 10 m resolution on-the-fly – height-dependent (database can be as coarse or fine as required)	Up to 1-5 m resolution on-the-fly – height-dependent (database can be as coarse or fine as required)
High-resolution data used where available (primarily in the US)	Location-independent	
Errors can add up to 650 m (1800 ft) vertically	8% of true height AGL	1-2% of true height AGL

Awareness functions (IXS/XXS)

Ground Obstacle Awareness

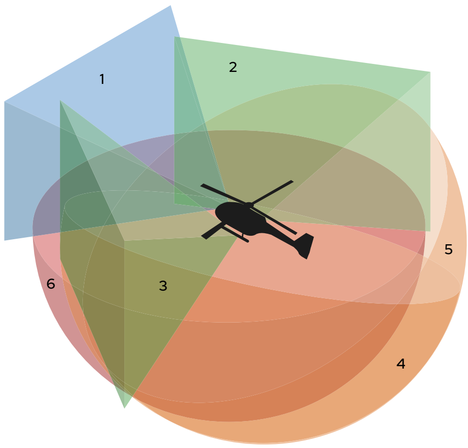
This function specifically recognizes masts, cranes, wind turbines and other narrow structures, as well as wires that may be suspended between them. As wires are extremely hard to see at a distance, this system uses any semantic clue it can find, plus any prior knowledge of where wires might be, to find segments of them that are then completed to include the invisible but very likely still present and dangerous suspensions. The found objects are placed in the persistent map for the duration of the mission and optionally beyond via a ground obstacle database, similar to the Coarse Terrain Awareness.

Forward-looking cameras:

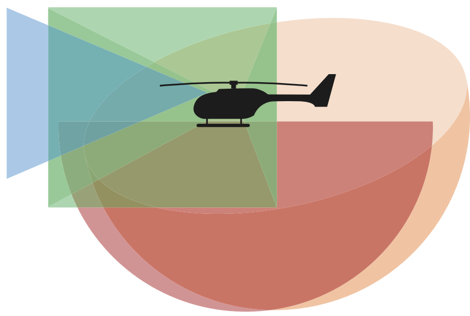
1 (straight)
2 (right)
3 (left)

Downward-looking cameras:

4 (left fisheye)
5 (right fisheye)
6 (LWIR, straight down, fisheye)



Isometric view



Side view

This function uses the feed from all cameras, with the forward-looking cameras for the far-field objects and main rotor strike and downward-looking cameras for near-field objects and main/tail rotor strike.

Lidar and radar can improve this function in the near, resp far field. It is important to realize that lidar just provides a point cloud; the logic to interpret some points as a mast or a wire and to fill in the missing parts of wires still needs the advanced AI that this function provides. The same goes for faint radar reflections of remote wire structures and metal powerline masts.

Weather Awareness

The weather awareness function identifies clouds and cloud types in the view, which are then placed as special temporary objects on the global risk map. A further semantic understanding allows us to identify the weather hazards like thunderstorms and icing in order to inform safe guidance. An ultra-short-time local weather prediction and monitoring system warns about hail, temperature inversions, deteriorating visibility, and changing wind conditions. Depending on the specific wavelength and power, a radar may provide additional source data, but lidar and LWIR are not expected to provide a further advantage.

Characterization of the system performance and accuracy for this function is a work in progress.

Traffic Awareness

The Traffic Awareness function merges visual detection with any existing cooperative instrumentation (ADSB-IN, Flarm...) and optionally radar to identify any airborne obstacle. It provides a semantic classification in order to be able to create a motion model to predict the short-term behavior of the object, which is then positioned in the global dynamic risk map. Adding lidar is not expected to provide an advantage.

The integration of a low-SWaP radar will significantly improve the range estimates, as well as performance in degraded visual conditions and the overall safety case (dissimilar failure modes). However, radar is not expected to significantly improve the detection range without a substantial increase in SWaP-C.

Resolution Advisories and automated guidance functions

Ground Collision Avoidance

Based on the positioning and the coarse terrain awareness, the ground obstacle awareness, and the tail rotor hazard awareness as represented in the Dynamic Mission Risk Map, this function can provide crew alerts like traditional TAWS. The function can also output constraints to the flight control computer and active guidance away from the hazard.

Traffic Collision Avoidance

Based on the airborne objects in the Dynamic Mission Risk Map, this function provides alerts and optionally Resolution Advisory guidance to avoid all currently identified hazards like traditional TCAS, which will be integrated. This function will be the first to be designed for DAL-B, with the underlying hardware and interface to the crew at DAL-B as well.

Regular Landing Guidance

The regular landing function can use the Positioning, Terrain Awareness, Runway/Helipad recognition, and the Landing Safety function to provide shallow or steep approaches to planned landing sites.

Emergency/Unplanned Landing Guidance

The Emergency/Unplanned landing guidance function uses all available information gathered during the mission so far into the Dynamic Mission Risk Map to provide guidance to approach at any moment a landing site that is within reach for autorotation. This function can be used to guide emergency autorotation but also by the crew to land in ad-hoc situations.

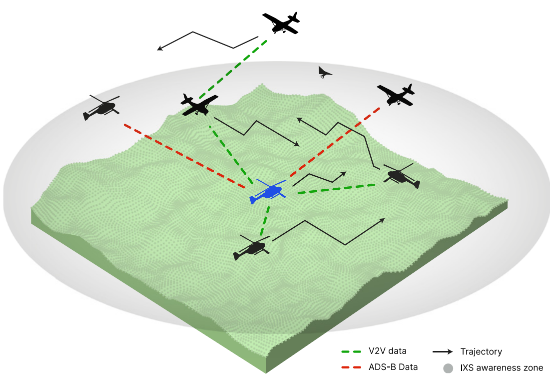
Follow Waypoint/Return To Base Guidance

The follow waypoint/return to base function can execute a preset flight plan, including a default "return to base", while maintaining all safety margins in flight, using all available information. Through the persistence of the Dynamic Mission Risk Map, the return-to-base function has at its disposal all observations during the mission so far. If conditions arise that make continued flight unsafe, the system can fall back to the emergency landing function.

Vehicle to vehicle communication functions

V2V Shared Risk Awareness (XXS only)

Devices with the ability to signal their presence to other airspace users, such as airborne transponders, are often not interoperable with each other due to the significant diversity of models, as well as the lack of technical standards, data transmission protocols and formats. For more than 40 years, there have been many efforts to standardize them, including EASA's current initiative [Electronic Conspicuity Systems](). We at Daedalean do not intend to wait until the emergence of one general standard, so we are designing the XXS as a proprietary V2V communication protocol. With it, Daedalean's customers can have the benefit of improved collaborative airspace safety, even without ATC participation.



V2V communications between the parties sharing situational awareness while flying around ADS-B cooperative and non-cooperative traffic

Updating the existing protocols of communication between vehicles, when every exchange is done via ground control, is a prerequisite for increasing the possible density of aircraft in the air. To prevent a collision, only one aircraft can be simultaneously over a large city such as London under the current instrument flight rules or from 5 to 10 under the visual flight rules. Therefore, the introduction of air taxis will require new types of communication equipment as well as protocols and regulations. But the development and enactment of those will, of course, take time.

V2V Shared Intention Awareness (XXS only)

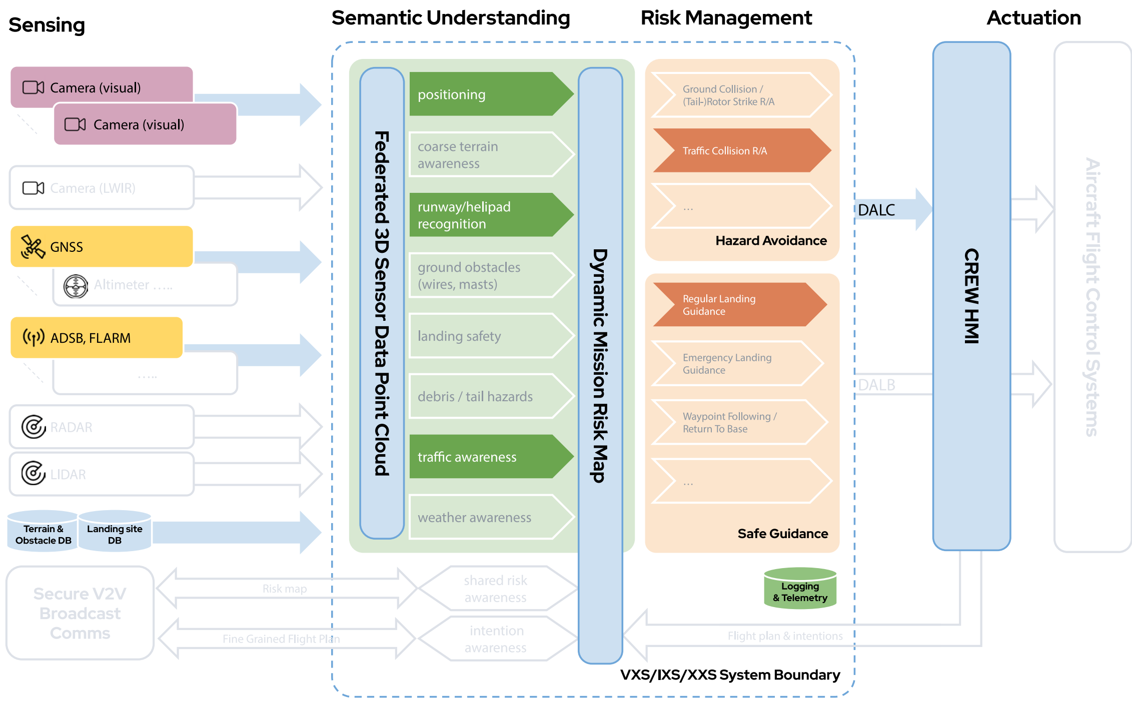
An extension of the shared risk awareness to allow for improved near future prediction has participating aircraft transmit their mission flight plan and any short-term deviations of it to the same group of authorized receivers.

System roadmap

Three snapshots of Daedalean's overall roadmap are presented below.

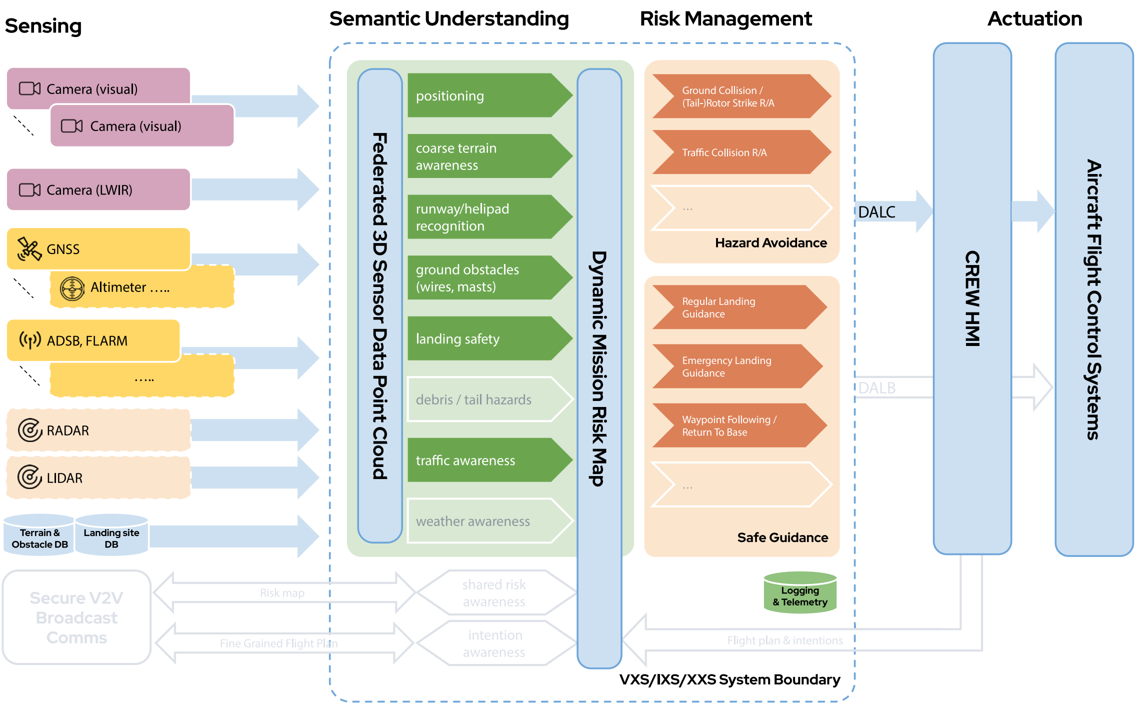
1. VXS "PilotEye"

VXS "PilotEye" based on Avidyne hardware represents the first product brought to market in 2023. It contains the core visual inputs and can perform Traffic Detection and Landing Guidance for Pilot Assistance over traditional crew displays (deduplicated ADSB traffic display and landing flight director) to DAL-C.



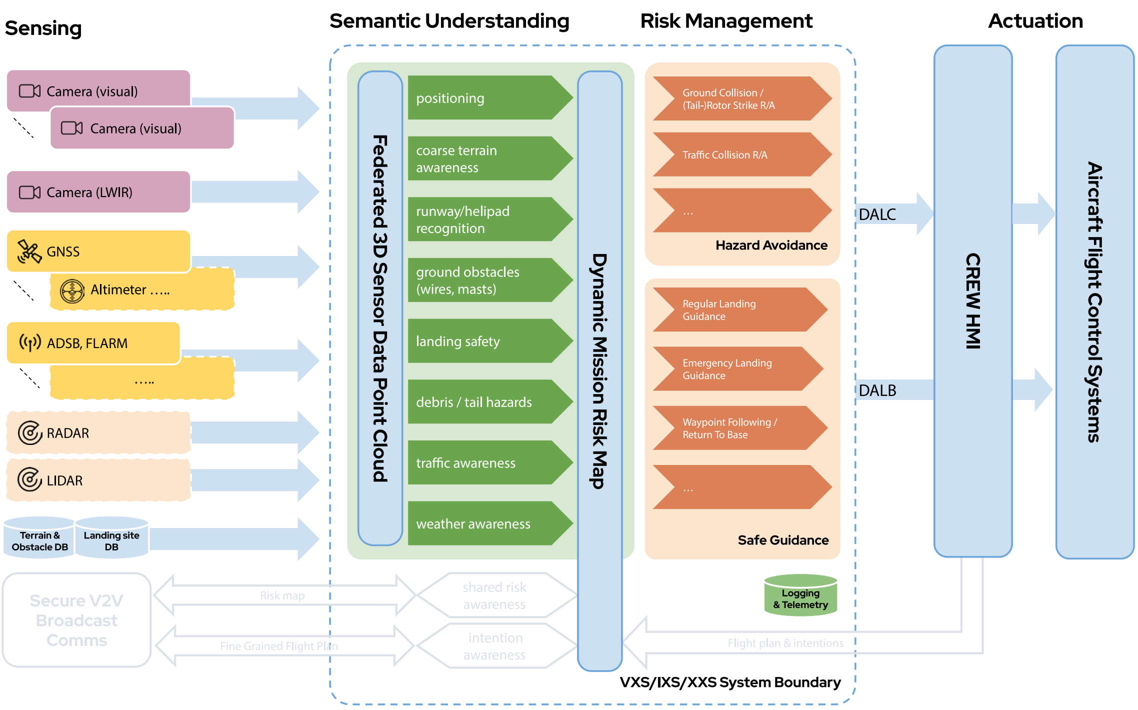
2. IXS

This version is hardware ready to DAL-B and adds terrain and ground obstacle awareness as well as landing safety awareness so that it can perform hazard avoidance, landing, and mission guidance as pilot assistance, with certain functions to be further re-certified to DAL-B after release.



3. IXS/XXS

Adding weather and debris awareness. The hardware is expected to become recertified to DAL-B in the course of 2026. We expect to be able to port over all existing software with the existing DAL-B functions, making it suitable for level 2 and level 3 applications from the moment of availability. The existing sensing and computational hardware will be ready to extend to the XXS functionality with no internal hardware upgrades. V2V communications are subject to be added at the next stage – the fully-functional XXS.



APPENDIX: Operational Conditions and Sensing modes

Long Wave Infrared (LWIR) Cameras

Daedalean's evaluation of short-wave infrared, mid-wave infrared, and long-wave infrared (LWIR) cameras have shown that short- and mid-wave ones provide very little benefit for any of the functions, but LWIR can provide a good view of the environment through moderate amounts of fog and large amounts of haze. A challenge is to find units that have sufficient resolution, framerate, and field of view, are not prohibitively expensive, and/or are heavily export-controlled.

LWIR cameras can be a sensible choice for navigation and landing, allowing these functions to be performed in fog and moderate clouds with a reasonable price tag. LWIR cameras for the Traffic Detection function are much more expensive. They will add about $50K per camera to the system cost to allow traffic detection at night and in fog at about half the range of our visual cameras. Still, this option can be attractive to some customers.

Lidar Fusion

Daedalean has evaluated its algorithms by fusing the data of an off-the-shelf lidar.

Fusing a lidar provides increased positioning and terrain awareness at a limited range only – up to 50m reliably, but due to the wavelength, it works well in IMC. A lidar covering a lateral 360 view but no downward view can be helpful in providing near-field awareness of main and tail rotor hazards. A downward-facing lidar can also enhance ground obstacle awareness. (Note that a machine learning-based approach is still required to interpret the point cloud and semantically understand wires, masts, etc..)

It is important to note that while the lidar provides enhanced depth, the pure visual function already provides a 3d awareness reconstructed from motion parallax. In a typical scenario, the aircraft will move, e.g., during a landing approach, meaning the situational awareness can already provide enough information for ground obstacle awareness. The lidar provides better depth but lower resolution than the visual EO cameras. While lidar is not part of the standard setup, whatever configuration is adopted, IXS/XXS can readily fuse this data into the visual scene.

Radar Fusion

Even more so than with lidars, as of today, no radar unit with sufficient performance, a usable field of view, low enough weight, size, and cost, usable on frequencies that are legal worldwide, with the appropriate certification pack actually exists.

Daedalean has evaluated units that meet different subsets of requirements. We established that a radar that would meet all requirements could add useful signals to fuse in the input of IXS/XXS. It could provide enhanced precision in VMC for Traffic awareness by using the beam to confirm suspected visual targets. It can also scan the terrain for positioning and coarse terrain awareness. It can provide further information for landing safety depending on the field of view.

Applying the machine learning-based semantic interpretation to the raw doppler spectrum returned by a probe, IXS can create a fused instrument beyond pure EO or pure radar.

Bistatic Radar

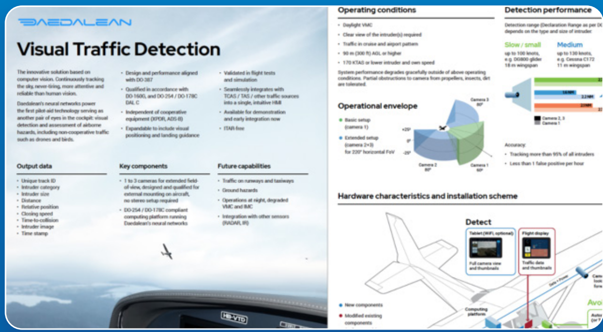
Traditional monostatic radar requires a transmitter antenna to be located on the aircraft. Another option would be to place transmitters on the ground, forming a network of stations illuminating the area around them. Such a radar, with transmitters spatially separated from receivers, is called a bistatic radar.

Bistatic radar offers a number of advantages: any number of aircraft can tune in without interference because each aircraft only has a passive antenna. Lack of transmitter on board also means lower SWAP-C and easier emissions licensing – only the ground stations require a license. Additionally, we get a very high fidelity and robust positioning signal from triangulating the ground stations. Bistatic radar makes the most sense for dense operations, where many aircraft share the same area, for example, over a major city. This is exactly the kind of operation where traditional monostatic radar may struggle due to interference, emissions regulations, and a high amount of clutter.

Daedalean is currently developing a proof of concept for TRL4. If successful, we expect that a market-ready and certified product will take further 4-6 years.

Download factsheets on Daedalean visual systems

Positioning and Landing



Visual Traffic Detection

Daedalean`s visual systems - overview

Eval Kit product overview

www.daedalean.ai/downloads

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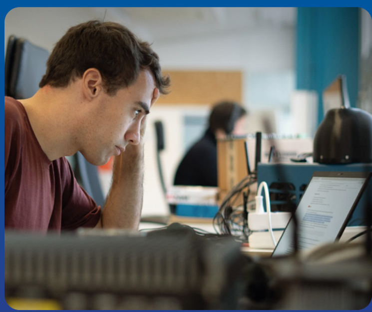


Paving the way to certify the use of AI in safety-critical avionics

EASA and Daedalean' joint reports: CodaNN 2020, CodaNN 2021 introduce the W-shaped Learning Assurance process for validation of deep neural networks in safety-critical applications.

The FAA and Daedalean joint report: evaluates how the W-process fits the FAA's future certification policy.

EASA European Union Aviation Safety Agency

Federal Aviation Administration

System engineering has its V — now machine learning has its W

Graham Warwick
Managing Editor, Technology with Aviation Week, aka The Woracle