

List Certified Components (TSO): None. The Table 1 below lists all Scan Eagle components.

System Descriptions		
Aircraft		
Modules	Avionics	Avionics canister has three slots for electronics. (Standard configuration: one slot open for expansion.) Structurally integrated into fuselage to reduce weight.
	Fuselage	Carbon fiber shell with avionics bay forward, propulsion/fuel tank bay at rear, shoulder-mounted wing adapter fairings, and an access hatch between wings.
	Nose	Standard nose module slings inertially stabilized camera underneath in transparent hemispherical dome, with a pitot tube/ probe (front-most) for measuring air data.
	Payload extension	Optional fuselage plugs stacked fore and aft of the wing offer additional payload capacity.
	Propulsion	Engine, generator, engine mount, engine control board, and fuel tanks.
	Wing & winglet	Carbon fiber wing with dual elevons and commercial servo actuators; field-replaceable winglets house communications options and vertical control surfaces.
Payloads	900 Mhz repeater	The FreeWave 900 MHz repeater can act as a node in a communications network, and can allow two-way data transmission, for example, passing messages and still images to troops on the ground.
	EO camera (electro-optic)	Standard camera payload offers excellent daylight imaging detail with the ability to hold frame on objects of interest for extended durations. Features include: Color, 25x zoom (newer models are 36x zoom), 640x480 resolution, 30 fps, FoV: 45° to 1.8°, and IR light filter.
	EPLRS repeater	The Enhanced Position Locating Reporting System (EPLRS) provides the military with means for identification, positioning, and navigation. This system also provides a data link for weapon systems integration.
	IR camera (infrared)	The Alticam 600-6000 infrared option has a 640x480 pixel sensor and supports a 7.5° digital zoom. The thermal IR-160 option offers video without requiring ambient light. Good at low altitudes, for dusk to dawn ops. Features include: Basic thermal night vision, 160x120 pixel sensor, 30 fps, and FoV: 15°. Also available, higher resolution IR cameras provide detection of finer detail or flight at higher altitudes. IR-320 provides improved thermal IR, 320x240 pixel sensor, 60 fps, and FoV: 18°. IR-640 provides high resolution thermal IR, 640x480 pixel sensor.
	L-band transmitter	The ROVER-Compatible L-Band Avionics unit (ROVER Avionics) allows transmission of video for viewing on a ROVER-III ground receiver. The ROVER Avionics transmits unstabilized video without overlays over an analog L-band wireless link.
	Magnetometer	A magnetometer in the nose, and vector magnetometers in each winglet, provide optimized sensing.
	Meteorology	Meteorological capabilities include: wind calculations, outside air temperature sensing, sea surface temperature sensing, and barometric pressure sensing. Additional meteorological payloads can be added easily.

System Descriptions			
Aircraft		(cont.)	
Payloads (cont.)	Transponder	The ultra-light transponder is programmable during flight. The transponder can be deactivated at any time during the flight for situations where detection might compromise the mission.	
Mission types	Combined sensor	Multiple sensors and communications relays can be combined in one aircraft. However, it will often be more effective to operate a fleet of UAV with different complementary sensors for achieving mission goals. The redundancy, inherent in multiple vehicles, and the elimination of potential sensor incompatibilities, support mission success.	
	Communications relay	The UAS can perform as a virtual communications tower for a mobile or fixed unit. Multiple aircraft can extend the range of communications over the horizon.	
	Electro-optic (EO) camera	The primary application of the UAS is visual surveillance of designated places and tracking targets of interest. The aircraft is equipped with an advanced, very light-weight camera turret that is inertially stabilized. The camera can look forward, back, down, and to the sides, while the aircraft is maneuvering. The aircraft can keep a target in view either from an orbit overhead, to the side, or from a standoff distance. The Sony EO sensor (EX780) has an IR light filter in place. Remove and reinsert the filter using night vision in I-MUSE (filter IR in Groundbase). Night vision mode lets in more light, and has been found to be very useful in low light situations.	
	Infrared (IR) camera	During night operations, an infrared sensor camera can be mounted on the inertially stabilized turret. This camera provides images of a fixed field of view at night, in the infrared range of the spectrum. During the day, these images can enhance a corresponding visual light image by providing information about the heat emitting from the objects in the view – in particular, vehicles and individuals.	
	Magneto-meter payload	The UAV can accommodate sensors for magnetic sensing and mapping operations, to provide extensive mapping of large areas and complement manned surveys.	
Specifications	Dimensions	Dimensions vary by configuration. The UAV is approximately 5 feet long (1.5 m) with a 10 foot (3 m) wing span and 7 inch (0.2 m) diameter fuselage. For precise data, refer to the Dimensions page of the aircraft parameter file spreadsheet.	
	Performance	Max level speed	72 knots 37 m/s
		Cruise speed (max wt.)	49 knots 24 m/s
		Service ceiling	19,400 ft 5,913 m
		Endurance	15 hours 15 hours
		Climb rate (max wt.)	400 ft/min 2 m/sec
		Still air range / No reserves	1,100 nm 2,000 km
	Weights	UAV (empty weight)	26.5 lbs 12 kg
		Fuel and payload	13.2 lbs 6 kg
		Max fuel	12.1 lbs 5.5 kg
		Max takeoff weight	44 lbs 18 kg

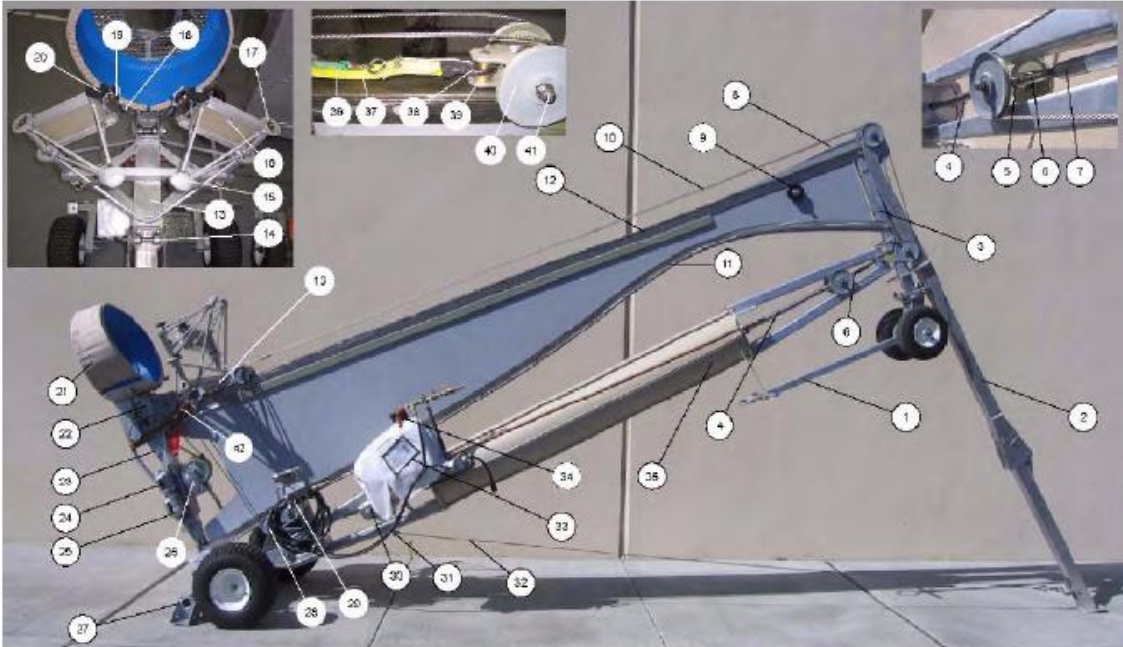
System Descriptions			
GCS			
Components – Major components	Telemetry radio modem	The standard TT&C (Tracking, Telemetry, and Control) link is provided by a two-way radio (freewave modem), installed in the winglet of the aircraft.	
	Tracking antenna	Air/ground communication is provided by a mix of omni-directional and high-gain antennas tailored to the frequency bands of operation requested by a user.	
	SkyHook GPS receiver	The SkyHook includes a GPS (Global Positioning System) receiver and antenna, which the UAV uses to make an accurate approach for retrieval.	
	Weather station (optional)	The optional weather station provides users with information on local conditions. The standard system provides data on wind speed, wind direction, temperature, pressure, and humidity. This is useful for takeoff and retrieval consideration.	
	Clear-to-land switch	The Clear-to-land switch (CTL) is a safety device used in retrieval. The aircraft will make autonomous decisions about the safety of its approach, and wave off if appropriate. The CTL device allows a ground observer to force a wave off if the situation is unsatisfactory or unsafe. The CTL switch is a rugged pistol-style trigger that provides the safety pulse. It generally plugs into the outside of the GCS.	
Launch systems			
Specifi- cations	Height (deployed, with aircraft)	10 feet	3.05 m
	Height (stowed)	6 feet	1.83 m
	Length (deployed)	21 feet	6.4 m
	Length (stowed)	16 feet	4.88 m
	Weight – desert configuration (approx.)	1,200 lbs.	544 kg
	Weight – maritime configuration (approx.)	1,500 lbs.	850 kg
	Width (no aircraft)	4.3 feet	1.31 m
	Width (with aircraft)	10.5 feet	3.2 m
	Power (external air source)	100 PSI, continuous	
	Power (attached air compressor)	110 VAC, 20 A, 60 Hz, Single Phase	

System Descriptions

Launch systems

(cont.)

Land-based configuration launcher nomenclature



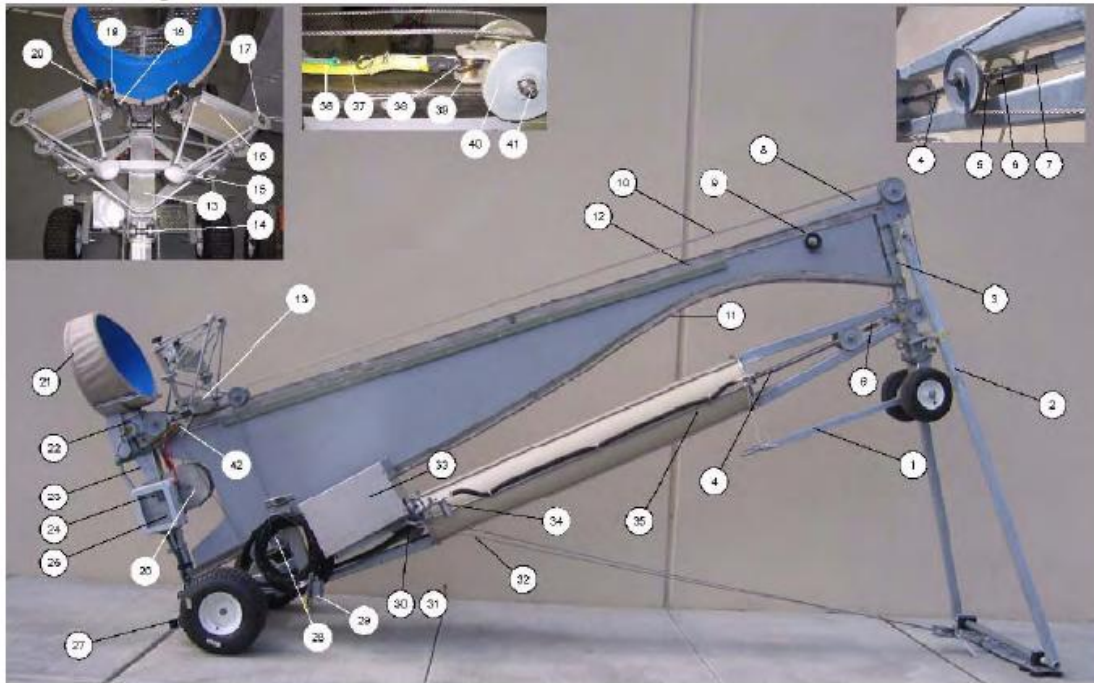
1. Drawbar	15. Gripper hooks	29. Remote
2. Aluminum kickstand	16. Grippers	30. Erection winch
3. Forward post	17. Brass brake adjustment nut	31. Erection cable stop
4. Piston rod	18. Lower gripper feet	32. Erection cable
5. Butress saddle	19. Upper gripper feet	33. Compressor
6. Butress	20. Pusher blocks	34. Air filter
7. Butress jam nut	21. Prop guard	35. Air cylinder
8. Ski ramp	22. Dog house	36. Trigger line (green rope)
9. Arresting pulley	23. Aft post	37. Cocking winch strap
10. Transmission cable	24. Speedo	38. Release shackle
11. Lower track	25. 120 VAC 60Hz outlet	39. Brass pull-back roller
12. Upper track	26. Cocking winch	40. Pulley (qty: 8 large, 6 small)
13. Upper carriage	27. Outriggers	41. Stud axle (qty: 7)
14. Titanium rollers (2 upper carriage, 2 lower carriage)	28. Lower carriage (bogey)	42. Safety pin (red rope)

System Descriptions

Launch systems

(cont.)

Marine configuration launcher nomenclature



1. Drawbar	15. Gripper hooks	29. Remote
2. A-frame kickstand	16. Grippers	30. Erection winch
3. Forward post	17. Brass brake adjustment nut	31. Erection cable stop (not pictured)
4. Piston rod	18. Lower gripper feet	32. Erection cable
5. Butress saddle	19. Upper gripper feet	33. Compressor
6. Butress	20. Pusher blocks	34. Air dryer
7. Butress jam nut	21. Prop guard	35. Air cylinder
8. Ski ramp	22. Dog house	36. Trigger line (green rope)
9. Arresting pulley	23. Aft post	37. Cocking winch strap
10. Transmission cable	24. Speedo	38. Release shackle
11. Lower track	25. 120 VAC 60Hz outlet	39. Brass pull-back roller
12. Upper track	26. Cocking winch	40. Pulley (qty: 8 large, 6 small)
13. Upper carriage	27. Marine configuration does not require outriggers	41. Stud axle (qty: 7)
14. Titanium rollers (2 upper carriage, 2 lower carriage)	28. Lower carriage (bogie)	42. Safety pin (red rope)

System Descriptions			
Retrieval systems			
Specifications – SkyHook	Boom length (deployed) (approx.)	27.5 feet	8.4 m
	Height (mast)	approx. 45 feet	approx. 14 m
	Height (stowed)	4 feet	1.22 m
	Length on deck (deployed)	12 feet	3.66 m
	Length on deck (stowed)	25 feet	7.62 m
	Power requirement	110-240V, 9 A, 50-60Hz, single phase	
	Weight	weights vary – see manufacturer's serial plate	
	Width (deployed or stowed)	4.2 feet	1.28 m
	Width (with aircraft)	10.5 feet	3.2 m
Software			
Bootloader	The bootloader is a software program that is installed on the aircraft and on the If/C. The bootloader provides an interface for reprogramming software, changing modem settings, and testing certain hardware. On the aircraft, the bootloader is also used to reprogram parameter files. On the If/C, the bootloader is also used to specify how the modem(s), GPS, tracking antenna actuator, and AHRS (Attitude and Heading Reference System) are connected to the If/C.		
Cursor-on-Target	Cursor-on-Target (CoT) is a standard developed for the military that is used to exchange target and situational awareness information between different systems. I-MUSE supports both sending and receiving targets and situational awareness.		
FlightSim	FlightSim is Insitu's software tool for development and simulation of onboard and ground elements, operator training, mission planning, and some elements of aircraft design. It provides a means for pre-testing flightplans and conditions, as well as assisting development of training and design.		
Global Mapper	Global Mapper is a stand-alone application that is installed on the GCS. It is used to customize map data to reduce the processing power involved in map display.		
Helmsman	Helmsman is the software program that runs on the aircraft avionics. Functions include flying the aircraft, navigation, and communications.		
If/C	The If/C software runs on the If/C computer. The If/C interfaces with I-MUSE, modem(s), ground GPS, tracking antenna actuator, AHRS, and the pilot's console.		
I-MUSE	I-MUSE is Insitu's Multiple UAV Software Environment for flight planning, monitoring, and operation. The graphic interface provides operators with comprehensive and easy-to-use tools for all phases of flight.		
I-MUSE server	The I-MUSE server connects to an If/C (using the Groundbase program and a serial port) in order to communicate with the aircraft and ground components. I-MUSE Client connects to the I-MUSE server using a network connection and provides the interface that allows an operator to control the aircraft and ground components. Multiple I-MUSE Client instances can connect to a single I-MUSE server, or a single I-MUSE Client can connect to multiple I-MUSE servers and display multiple aircraft on screen.		

System Descriptions	
Software (cont.)	
MPEG server	Video data stabilized in I-MUSE or ObjectTracker is streamed to the MPEG server in analog format. MPEG-4 converts the video to digital format and sends it over the network. Anyone connected to the network can view the MPEG-4 stream.
ObjectTracker	ObjectTracker is an image processing program designed to keep the target of interest within the camera's field of view. Thus, it helps to reduce operation workload as it automatically points the camera for the pilot.
Parameter files	Parameter spreadsheets contain specifications for aircraft characteristics, communication protocols, and mission details.
S-VEST	S-VEST is the video exploitation system. It is a combination of software components that captures and displays video information for third-party analysts.