

**APPENDIX C**

**Modifications/Changes S/N 602 to S/N 617 & S/N 618**

*The following table describes the improvements to the system in a comparison chart. All upgrades have been tested by the manufacturer in Israel and by NMSU PSL TAAC in restricted airspace. NMSU PSL TAAC validates that these modifications/changes introduced no adverse effect on airworthiness.*

<b>Analysis of Modifications/Changes S/N 602 to S/N 617 &amp; S/N 618</b>				
<b>Component</b>	<b>602 PMA 263 - NAVAIR</b>	<b>PSL/TAAC 617/618</b>	<b>Comments</b>	
<b>Airframe</b>				
	Construction	Prototype	Production Model	Aerostar in serial production using advanced quality control assessment methods. Extensive flight testing performed. Aerostar has more than 20,000 flight hours operating in more than five countries.
	Wing	Styrofoam (full wing)	Hollow wing with center beam	Adds strength, reduces weight, and stress tested by manufacturer
	Main Landing Gear	Prototype	Upgraded	Improvements: new geometry, structure thickening, and service bulletin corrective action.
	Rudders	Prototype One (1) rudder	Upgraded Two (2) rudders	Original design integration maintained, & added redundancy. Increases aircraft control in flight during cross winds.
	Wiring	Prototype	Upgraded	Wiring now produced with aerospace/mil-spec standards.
	Wing tips	Prototype	Dropped wing tips	Provides better aerodynamics and lift at slow speeds.
<b>Fuel gauge</b>		Bouy fuel gauge	Capacity fuel gauge	Fuel gauge is calibrated to provide exact fuel amount onboard.
<b>Gyro</b>		Single gyro	Two gyros	Original design integration maintained, added redundancy.
<b>Engine</b>				
	Manufacturer	DH 290cc	Zansottera 498 Pro	New technology engine.

		HP 24	HP 38	The DH290cc engine manufacturer was cutting production of the 290cc engine. The Zansoterra 498 Pro along with 4 other engines bench, ground, and flight tested. The Zansoterra 498 Pro was selected by the manufacturer and currently has more than 2000 hours of flight hours on this series.
			Improved power to weight ratio	Provides improved power, and additional power
		Mechanical throttle	Computer controlled	Provides more accurate control of the throttle
			Better fuel consumption	More endurance
			Higher icing durability	Safety feature
<b>Servos</b>		Tonegawa-non-MIL standard	Kearfotts's K-2000 MIL standard	Manufacturer changed to a sturdier and more reliable MIL standard servo for better performance and reliability.
<b>Comms</b>		L/S Band	C Band	See below
<b>Software</b>		Navigation to single point	Two programmable RH programs from which to select	Provides a back-up return home mode with programmable routes to include speed, altitude, wave points avoiding populated areas, high terrain, etc. Program has capability to pre-program and update emergency landing points during flight to ensure that if a failure were to occur, it would land in a pre selected non-populated location.
<b>Configuration</b>				
	2. B. Payload with or without	NAVAIR Lists many payload and configurations	TAAC has a pilot window, Quad EO/IR, and a DSP1 EO/IR and mounts other payloads within manufacturer's specifications.	Payloads for the Aerostar are driven by the mission. All payloads must remain under 110lbs and the aircraft has to be weighed and balanced when payloads are changed as per manufacturers' specifications.
	2.C. Engine	2-Stroke, 2 cyl, 290cc	2 stroke, 2 cyl, 498 cc, 38 Hp	Engine provides more horse power giving the aircraft improved flight dynamics

	2.D. Avionics	UMAS	UMAS with more inputs	Navy and NMSU UMAS's are now running the same version software.
	2.E. Uplink	Primary: UHF or S Band, Secondary: UHF	Primary: C Band, Secondary: UHF	See below
	2.F. Downlink	L Band	C Band	See below
	2.G. Fuel	98 lbs	60 liter	98lbs
<b>3. Limits</b>				
	3.B. Airspeed	110 KIAS MAX, 45 KIAS MIN except as required for take-off and landing (autopilot).	80 KIAS MAX, 55 KIAS MIN except as required for take-off and landing (autopilot).	Manufacturer's specifications on airspeed.
	3.C. Angle of bank	60 Deg max (autopilot limit)	45 Deg max (autopilot limit)	Provides safer flight parameters, minimizes chance of stall during flight, and prevents human error.
	3.I. Fuel	100 LL avgas mix w/lube oil of 25:1 fuel to oil ratio	100 LL avgas mix w/lube oil of 50:1 fuel to oil ratio	Manufacturer's fuel mixture is different because of the change in the engines.
	3.J. Engine Lubricating oil	Chevron TCWIII 2-stroke oil	Castrol TWCIII 2-Stroke oil	Manufacturer's requirement
<b>4. Special Warnings</b>				
	4.A Radiation Hazards	3' from ADT, 6' front of GDT, & 9' from Freewave antennas	UAV low: 40 cm, high: 1 m; UHF low 60 cm, high 2.5 m; GDT low 4 m, high 11 m.	Manufacturer safety recommendation
	4.F. Max Time Engines	25 hours replace spark plugs and check for heat distress	Spark plug change every 10 hours, 75 hours return for overhaul	Spark plugs change every 10 hours and overhaul every 75 hours.
Items #s 20, 31 & 33	Manufacturer has two separate communication link systems which it delivers with the aircraft, L&S bands or C Band, with UHF being the secondary control link for both. NAVAIR (SN 602) uses L and S band for their primary control communications. During the decision process, PSL/TAAC conferred with our Telemetry and Missile Systems Lab and then with the White Sands Missile Range DOD Area Frequency Coordinators to determine the best possible choice, as TAAC would primarily be operating in the southwest in both the NAS and restricted airspace. Following spectrum			

	analysis surveys conducted by both entities, "C" Band communications was the optimum choice for our purposes and became the selection.