RST

KUBBE

STRATEGIC FACILITY SECURITY SYSTEMS

INNOVATIVE REMOTE SENSING TECHNOLOGIES

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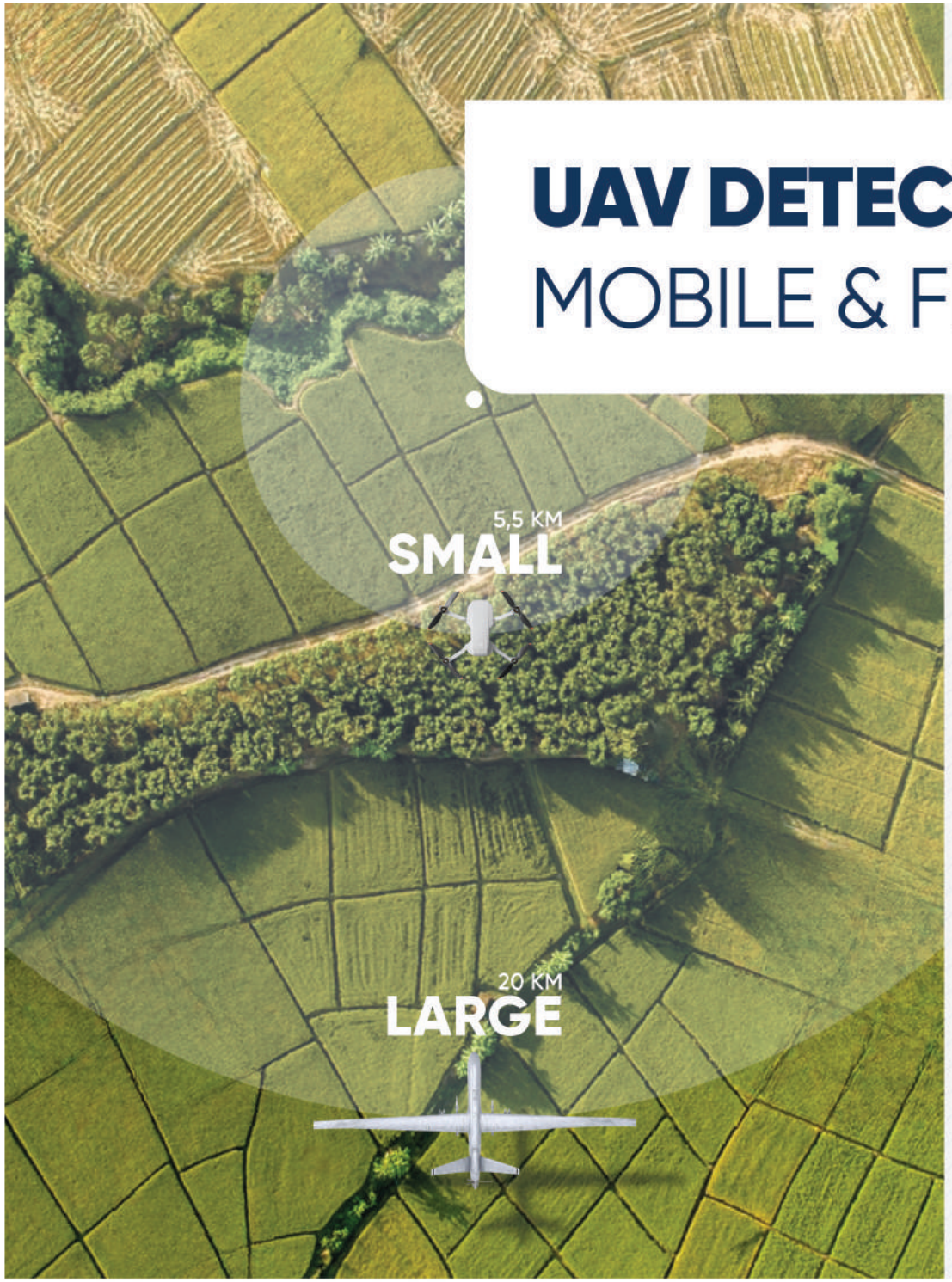
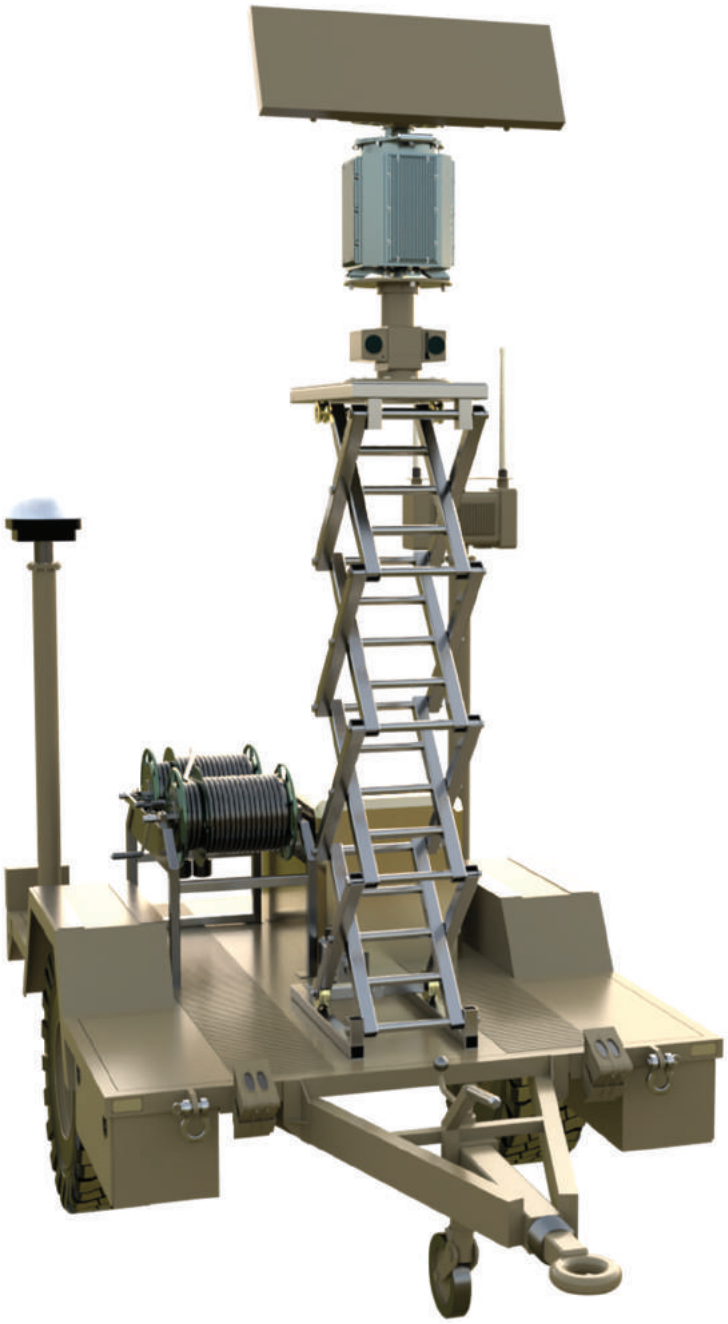
UAV DETECTION RADAR

MOBILE & FLEXIBLE





SYSTEM: FULLY INTEGRATED SYSTEM

RADAR Sub-system
Jammer and Spoofing Sub-system
RF Detection Sub-system
Optical Camera Sub-system
Command Control Sub-system
Power Sub-system
Trailer and Electro-mechanical Sub-system
Auxiliaries

SYSTEM: INTEGRATED SINGLE OR MULTI MODE OF OPERATION

Mode of Operation	Fully Automatic, Semi-Automatic and Manual
Data Correlation	Automatic data correlation between sensors
Command Control	The system can be operated from single C2 by one operator
Remote Upgrade	The system can be upgraded remotely
Installation	Less than 30 minutes with single operator
Operational	Day and night, uninterrupted 24 hours
Power	Power generator and mains
Architecture	Separable System shelter and trailer
Dimensions-All System	3850 x 2500 x 5000 mm (H x W x L)
Dimensions-System Shelter	2350 x 2500 x 4100 mm (H x W x L)
Dimensions-Trailer	1400 x 2500 x 5000 mm (H x W x L)
Weight	Lessthan 7000 kg
Transport with plane	Hercules C-130 or similar planes and Towing with Armored Vehicle
Field of Operation	Install and operated at a wide field of view stationary location

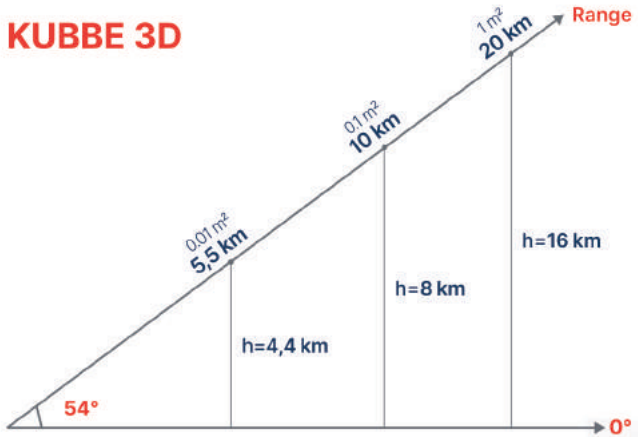
RADAR-GENERAL FEATURES

Type	Pulse Doppler RADAR
Capability	Surveillance and Tracking
Dimension	3D (Range, Azimuth and Height)
Detection Range	In long range mode
Micro UAS	5,5 km RCS 0,01m2
Fixed Wing UAV	10 km RCS 0,1m2
Mini UAS	10 km RCS 0,5m2
Small UAS	20 km on RCS 1m2
Vehicle	22 km on RCS ≥ 2m2
Azimuth Coverage	360°
Elevation Coverage	-2 to 51°
Range Accuracy	≤ 15 m (RMS)
Azimuth Accuracy	≤ 1° (RMS)
Elevation Accuracy	≤ 1° (RMS)
Height Accuracy	≤ 10 m (RMS)
Velocity Accuracy	≤ 0,8 m/s
Range Resolution	15 m
Azimuth Resolution	≤ 2° (RMS)
Elevation Resolution	≤ 2° (RMS)
Probability of Detection	80 %
MTBF	5000 hours
Track Capacity	200 tracks
Update Rate	2 Sec (30 RPM) / 4 Sec (15 RPM)

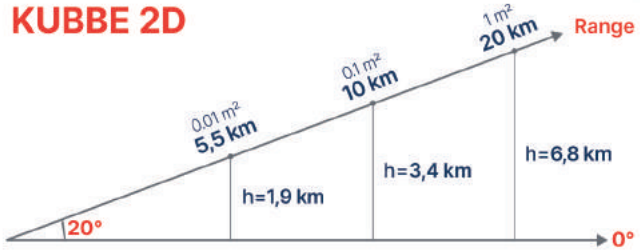
RADAR-ANTENNA

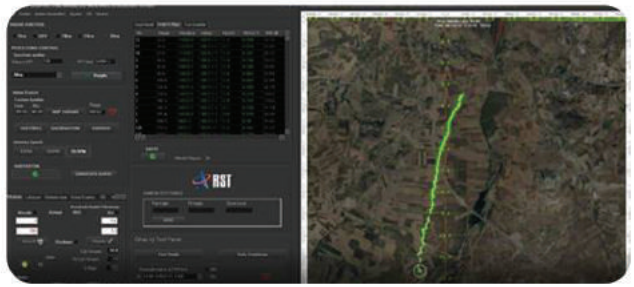
Antenna Technology	Slotted Wave guide Antenna
Peak Power	≤ 300 watt
Operating Frequency	X Band
Type of Beam	Multiple Pencil Beams
Rotation Rate	1-30 Rpm

KUBBE 3D



KUBBE 2D





KUBBE UAV Detection Radar Mobile & Flexible

JAMMER AND SPOOFING - ANTENNA

Antenna Tecnology	Omni Directional, Directional Antenna
Omni Antenna	0 dBi
Helical Antenna	>10 dBi
Horn / Helical Antenna	>10 dBi
Log Periodic Antenna	>6 dBi
Rod/Stick Antenna	0 dBi
Type of Beam	Directional and Omni Directional
Output Power	More than 3kW total radiated power
20-500 MHz	50 W
433 MHz	35 W
868 - 900 MHz	35 W
1200 MHz	75 W
1500 MHz	75 W
2300 MHz	35 W
2400 MHz	35 W
5000 MHz	20 W
5800 MHz	20 W
8000-18000 MHz	50 W
Jammer Signal	DDS, SDR, barrage noise and mixed modulated signals
Polarization	Vertical, Circular and Slant

JAMMER AND SPOOFING

Jammer Controller	Fully digital control
Software	Control, maintenance, upgrade from GUI (Graphical User Interface)
Integration	Naturally integrated to RF detection system and manage it to avoid from hazardous
Channel mode	Independent frequency channels
Jamming Frequency	20-500, 433, 868, 900, 1200(GNSS), 1500(GNSS), 2300, 2400, 5000, 5800, 8000 - 18000 MHz
Programmable	User Programmable Frequency Channels both 20-500Mhz (Instantaneous Bandwidth 100 MHz) and 8000-18000Mhz (Instantaneous Bandwidth 1GHz)
Profile	Single or Multi Channel radiates simultaneously
Emergency	All channels start to radiate with a single button
Power Amplifier	Control each frequency bands PAs
PA Technology	Solid State GaN on SiC transistors
Drivers	PA power and filtered signal drive to get max efficiency

RF DETECTION

Antenna Technology	Omni Directional
Operating Frequency	433, 868, 900, 1200, 2400, 5800 MHz
Detection Range	
433MHz (1W)	> 5000m
868-900MHz (1W)	> 5000m
1200MHz (1W)	> 3000m
2400MHz (100mW)	> 1000m
5800MHz (100mW)	> 750m
Type of Beam	Omni Directional
Detection Algorithm	Correlation, Comparing captured one with database
RF Front-end	Limiter, LNA, BPF, Attenuator configured front-end
Features	Detection of band, Power of signal, automatically discard local signal, Auto calibration for NF flatness.
Receiver Sensitivity	- 90 dBi (10 dB SNR)
Receiver Type	Software Define Radio

OPTICAL CAMERA

Thermal Camera / Infra-Red (IR)	
Elevation Coverage	+/-90
Azimuth Coverage	360°
Angular Velocities	≥ 120°/Sec
Angular Report Accuracy	≤ 1mRad
Control	Zoom, Focus, AGC on/off, AGCROI, NUC Selection, NUC Calibration
Focal Length	15–300 mm
Lens	Continuous Optical Min Zoom x20
Field of View	2.3 - 44.5 deg - det: 640x512; Zoom x36
Sensors Performance	• Detection Range: MicroUAS > 1500m, Mini UAS > 3000m, Small UAS > 5000m • Identification Range: Micro UAS 800m, Mini UAS 1500m, Small UAS 3000m

OPTICAL CAMERA

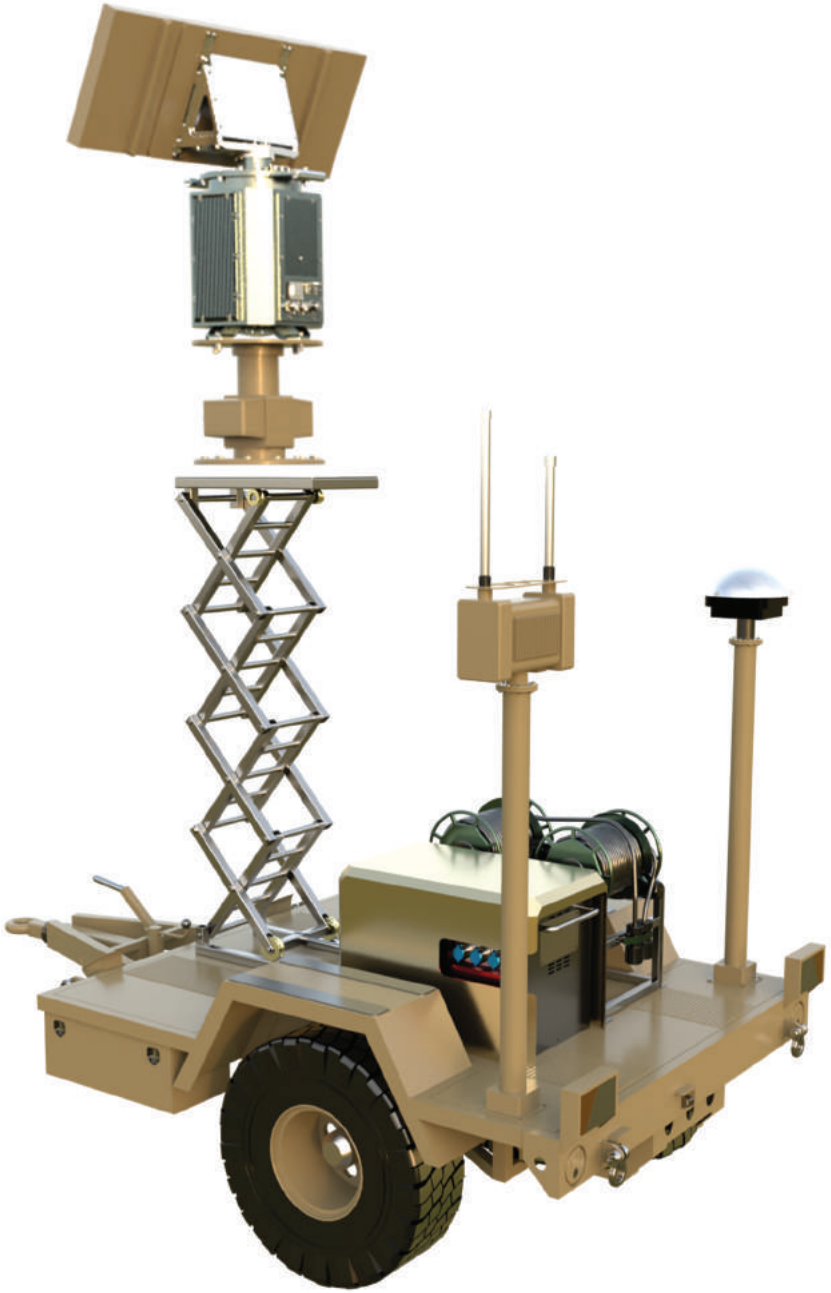
Low Light Camera / Day TV Camera (DTV)	
Elevation Coverage	+/-90
Azimuth Coverage	360°
Angular Velocities	≥ 120°/Sec
Angular Report Accuracy	≤ 1mRad
Modes of Operation	Rate Position, Automatic Video, Tracker, Bite
Control	Zoom, Focus, AGC on/off
Focal Length	6.5 - 262.5 mm
Lens	Continuous Optical Min Zoom x25
Field of View	2.3 - 58.1 deg - det: 1920x10800
Sensors Performance	• Detection Range: Micro UAS 3000m, Mini UAS 6000m, Small UAS 9000m • Identification Range: Micro UAS 1000m, Mini UAS 2000m, Small UAS 3100m
AI Classification	Automatic Classification Based on Artificial Intelligence Algorithm

OPTICAL CAMERA

Ultra-Low Light Camera (LLC)	
Elevation Coverage	+/-90
Azimuth Coverage	360°
Angular Velocities	≥ 120°/Sec
Angular Report Accuracy	≤ 1mRad
Modes of Operation	Rate Position, Automatic Video, Tracker, Bite
Control	Iris, Focus, AGC on/off
Focal Length	45 mm
Lens	F/0.85, 45mm ultra-low light fixed focal length lens
Field of View	10.25 deg-det: 752x582
Sensors Performance	• Detection Range: Micro UAS 600m, Mini UAS 1200m, Small UAS 2000m • Identification Range: Micro UAS 200m, Mini UAS 400m, Small UAS 700m
AI Classification	Automatic Classification Based on Artificial Intelligence Algorithm

OPTICAL CAMERA

Laser Range Finder (LRF): This is optional feature	
Wavelength	1.5 um
Range	3 - 12000m
Performance	6000m (NATO standard target 2.3x2.3m, visibility 25km, target reflectivity 30%, detection probability 90%)
Angular Report Accuracy	≤ 1mRad
Precision	1m



COMMAND CONTROL

PC	Rugged PC
Operating System	Windows 64 bit
Processor	i7 or better
Memory	DDR4
Display	14" Full HD Display
Disk	SSD min 512GB
Software	
Command Control Software	
RADAR Control Software	
Jammer, Spoofing and RF Detection Software	
OpticalCameraSoftware	
Display	24 or 27" Full HD Display
Refresh Rate	Minimum60Hz
Response Time	Under 5ms refresh rate

POWER

Power Distribution	Power panel, Automatic power transfer from power sources
Circuit Breakers	Each power line prevented separately
Voltage, Phase	220VAC, 50Hz
Cable	220VAC power cable 50m length
Indicators	Voltmeter, Amperemeter, Phasemeter, LED indicators, Labels, Power Diagrams
Switches	Each power line can be switch

POWER – POWER GENERATOR

Engine	Diesel engine
Capacity	> 10kVA
Output Voltage	220VAC
Phase	True Sine, 50Hz
Fuel	Diesel
Uninterrupted Operation	200h

POWER-UPS

Capacity	9kVA
Voltage	220VAC
Duration	15minutes at max load
Type	True online

TRAILER

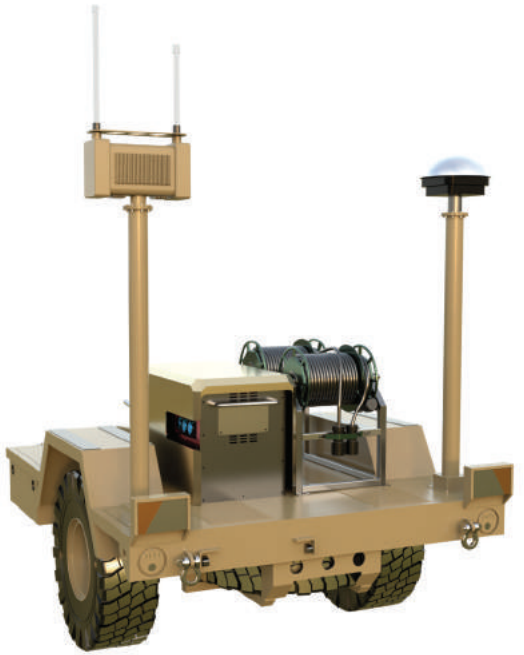
Material	Steel
Brake	Air supported brake system
Electrical Interface	7/12 pin mil spec
Tire	Run-flat
General Features	Indicators, towing hook, security chains etc.

ELECTRO-MECHANICAL STABILIZATION LEGS

Material	Steel
Motors	24VDC motors and Gearbox
Capacity	More than 7000kg
Mounted Point	Directly to Shelter Body

SHELTER

Material	Aluminum and Steel
Wall	Isolated sandwich panel
Fixture	Standard fixing and carrying points
Door	Double sealed with lock doors
Connector Panel	All cables through wall with a connector
Roof	Electro-mechanical cover
Air Conditioning	Ventilation fan
System Room	19″ Rack Cabinet
Illumination	LEDs, inside and outside of shelter



ELECTRO-MECHANICAL ELEVATED TOWER

Material	Steel
Motors	24VDC motors and Gearbox
Capacity	More than 500kg
Elevated Height	More than 2500mm
Nested Height	Less Than 1000mm
Troubleshoot	Manually operated
Mounted Point	Directly to Shelter Chassis

AUXILIARIES

Grounding Equipment
Tools box
Jerry Tank
Telescopic Ladder
Fire Extinguisher
Cables
Connectors

ELECTRO-MECHANICAL PAYLOAD POSITIONER

Control	Automatic, Manual
Software	Integrated to C2 software
Elevation	+70°
Azimuth	-180 to +180°
Speed	<10rpm

SUPPORT

Warranty	Minimum 1 Year
Availability of Spare Parts	Minimum 10 Years
Update Software	Free if Available

INITIAL SPARE PARTS

Critical Spare Parts and Consumable Items (100%) forMinimum 1 Year Support	
Maintenance parts	Ready Stock

DOCUMENTATION

Operating Manuals	Minimum 2 Hard Copies and 1 Soft Copy
Technical/ Maintenance	Minimum 2 Hard Copies and 1 Soft Copy

Adres

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