

APPENDIX D

PIONEER

The Pioneer system is a miniature high-wing light aircraft with a pusher propeller driven by a rear mounted, two-cylinder, aviation gasoline (AVGAS) engine (see Figure D-1). The system was acquired rapidly, as an interim system, to fill an immediate need to provide the operational forces with deployable tactical assets. The Pioneer is currently fielded with one company in the US Army, and numerous elements in the United States Marine Corps (USMC) and the USN. The Army's Pioneer system is used for force projection operations, the development of doctrine, and TTPs for future UAV operations. It will be returned to USN control after fielding of the JT-UAV.

MISSION

The mission of the Pioneer is to provide day and night aerial IMINT support to Army force projection forces. The Pioneer is capable of performing all missions as outlined in Chapter 1.

ORGANIZATIONAL STRUCTURE

The Army's Pioneer system is currently assigned to the 111th MI Brigade at Fort Huachuca, Arizona.

EQUIPMENT

The Pioneer system consists of five UAVs, five-day televisions, four FLIR payloads, a GCS, a portable control station (PCS), a remote receiving station and associated GSE.

- The MKD-200 (Day Sensor) is a stabilized television (TV) camera used only in daylight conditions. Its capabilities include—
 - Vehicle target detection 18 km (visibility).
 - Vehicle target recognition 3.2 km.
 - Focal length 11 to 110 mm w/beam expanded
22 to 220 mm.
 - Wide FOV 34° x 46°.
 - Narrow FOV 3.4° x 4.6°.
 - Zoom lens Speed less than 9 seconds.
 - Focus speed Less than 25 seconds.
 - Raster format.
 - A 525 line TV.

- The MKD-400 (Day and Night Sensor) is a Nitrogen cooled FLIR used in day or night conditions. Its capabilities include—
 - Wide FOV Vehicle target detection up to 3.1 km.
 - Vehicle target recognition up to 1.4 km.
 - Narrow FOV Vehicle target detection up to 7.7 km.
Vehicle target recognition up to 1.4 km.
 - Camera rotation 360°.
 - Maximum altitude 12,000 to 15,000 ft (density
altitude dependent).
 - Immediate product In-flight reporting.
 - Scan rate 25 to 30 MHz.
 - Cool down time Less than 50 seconds.
 - Targeting accuracy.

- Data link carries UAV and payload control data to the UAV, and video

and telemetry to the ground. Its capabilities include—

- Operating range 185 km.
- Electronic attack Jam resistant.
- C-Band transmitter 30 W.
- Ultra high frequency (UHF) backup transmitter 50 W.
- Antenna Omnidirectional.
- In 100 kHz steps 420 to 450 MHz.
- Video down link 4,750 to 4,950 MHz.

- The GCS is the primary station for the Pioneer system as shown in Figure D-2. It is mounted on a 5-ton truck, and includes a bay for operator control, AV tracking, and payload control. The tracking and communications unit (TCU) is the communications link between the GCS and the AV (see Figure D-3). It is mounted on a HMMWV and includes the communications, tracking, and antenna systems for ground control.

- The PCS is a small modular control station installed in three cases which allows for fast and easy deployment (see Figure D-4). The primary purpose is to extend operational range by controlling the UAV from remote locations. Its capabilities include—

- Range 40 km.
- Antenna Omnidirectional.
- Power 28 V.
- Tracking capability Manual only.

- The remote receiving station is designed to receive and display data transmitted by the AV's data link at remote sites (see Figure D-5). Its capabilities include—

- Range
40 km.
- Antenna
Omnidirectional.
- Power
28 V.
- Selectable channels 10.
- VCR-12
Standard mount.

Fig D-2 (full)

Fig D-3 (full)

Fig D-4 (full)

Fig D-5 (full)

CAPABILITIES

The Pioneer system has the following capabilities:

	Rolling takeoff 1,400 to 2,000 ft (depending on density altitude).
	Arrested recovery 70 to 130 m.
	RATO 0 m.
	Rolling recovery 366 m.
	Dash speed 100 kts.
65 kts.	Cruise velocity
54 kts.	Stall speed
55 to 65 kts.	Landing velocity
16.9 ft.	Wingspan
3.3 ft.	Height (overall)
75 lbs.	Maximum payload
	Maximum takeoff 450 lbs.
	Endurance 5 hrs.
	Maximum altitude 12,500 ft.
27 horse power.	Engine
	Fuel
	100 Octane, low-lead AVGAS.
	Length (overall) 14 ft.
	Weight 267 lbs.
	Full fuel 60 lbs.

LIMITATIONS

The Pioneer system has the following limitations:

- Maximum head wind for takeoff and landing is 25 knots with gusts to 30 knots.
- Maximum cross wind for takeoff and landing is 15 knots with gusts to

20 knots.

- Maximum winds at flight level is 60 knots.
- Cannot fly in icy conditions; ambient air temperature of 0° or less; visible moisture (fog, rain, clouds) exists; and separation between ambient temperature and dew point temperature is less than 3°.
- Does not fly in rain or visible moisture of any kind.
- Navy maintenance channels must be used.
- Company cannot support itself in the field.
- Limited to two possibly three missions per 24-hour period.
- Chase plane required when flown out of restricted airspace (subject to FAA approval, see Chapter 3).

AIRSPACE MANAGEMENT

The airspace management procedures are the same as those discussed in Chapter 3.

OPERATIONS

The operations of the Pioneer system are similar to the JT-UAV discussed in Chapter 6. Figure D-6 is an example of deployment.

SITE SELECTION

The Pioneer system is launched, recovered, and maintained from the L/R site. Planning and conducting the mission is accomplished from the mission planning and coordination site. Having the two sites collocated is optimal for C² and logistics reasons; but mission requirements, terrain, threat, and the enemy situation may require them to be split apart. In addition to the site selection criteria discussed in Chapter 2, the Pioneer L/R site must include a runway of at least 1,400 to 2,000 feet. The AV can be launched from a remote site using a RATO or rail launcher, but it must be recovered by a roll-on, net, or arrested landing. Landing distance can be reduced by a landing arresting cable (LAC). The LAC brings the Pioneer to a halt in a short distance (approximately 70 to 130 m).

Fig D-6 (full)