Introduction

The Royal Danish Air Force has requested your company to deliver a self protection suite for the F-16 combat aircraft. The required solution incorporates a pod and an intelligent cockpit control unit for controlling the EW suite. The pod will be dispensing payloads (chaffs and flares) and hosting the Missile Warning System (MWS). The solution shall provide warning upon detection of missile threats and be able to automatically dispense payloads in response.
The MWS will be provided as Government Furnished Equipment (GFE) and be physically installed by your company.

Requirements

	Functional requirements
UR-1	The pod shall include a minimum of eight standard magazines.
UR-2	The pod shall be able to dispense forwards, downwards and sideways.
UR-3	Introduction of the system may not compromise the operation of the current weapon systems.
UR-5	Threats shall be transmitted to the aircraft mission computer in body frame format (relative to aircraft) for displaying purposes.
UR-6	The system shall provide the aircraft mission computer with status information and built in test results.
UR-7	The system shall interface the aircraft intercom system to provide audio cues and warnings.
UR-8	The system shall include a hardware implemented safety interlock to prevent dispensing on ground.
UR-9	The system shall be able to erase sensitive data upon input from a discrete zeroize signal from aircraft.
UR-10	The system status on individual LRU level shall be provided by cockpit unit.
UR-11	The cockpit unit shall be able to control power of dispensing system and MWS.
UR-12	The system shall comprise at least three modes, manual, semi automatic and automatic.
UR-13	Manual mode shall dispense the program selected by the pilot.
UR-14	Semi automatic shall initiate an intelligent threat response upon consent from the pilot.
UR-15	Automatic mode shall initiate an intelligent threat response without pilot interaction.
UR-16	The system shall provide a method of loading software to MWS.
	Performance requirements
UR-20	The system shall be able to dispense a minimum of two payloads simultaneously.
UR-21	The system shall be able to dispense an intelligent pattern of payloads programmable by customer.
UR-22	The system shall provide the optimal coverage against missile threats.
	Environmental requirements
UR-30	The pod structure shall remain intact when exposed to steady state acceleration levels of 5g fore 2.5 aft, 25g up, 11 down.
UR-31	The total weight of pod cannot exceed 270 kg.
UR-32	The pod shall be operational at temperatures of 95°C on outer skin and 102°C on leading edge for 25 minutes.
UR-33	The pod shall be operational at temperatures of 134°C on outer skin and 151°C on leading edge for 3 minutes.

	Interface requirements
UR-40	The cockpit unit shall communicate with the MWS via a MIL_STD-1553-B data bus.
UR-41	The cockpit unit shall communicate with the mission computer via a MIL-STD-1553-B data bus.
UR-42	The pod shall be mounted on the aircraft wing with standard T-hooks spaced by 13 inches.
UR-43	The power consumption of the pod shall not exceed 700W
UR-4	The pod shall be mounted on the left-hand wing.

Preconditions

Power

Your company has access to a qualified Power Conversion Unit, converting 115VAC 400Hz to 28VDC. The PCU can output a maximum of 250W. The PCU weighs 25 kg.

Missile Warning System

The MWS consists of six sensor units and one Electronics Control Unit (ECU)
The ECU will provide threat information in inertial format. Direction of the threat is relative to north.
The MWS must receive navigation data from the aircraft mission computer with a minimum latency. Navigation data includes aircraft attitude, heading, altitude and GPS data.
The MWS is qualified to the following steady state acceleration levels 4g fore 2.5 aft, 22g up, 10 down.
The MWS requires a maximum of 85W from 28VDC and a maximum of 100W from 115VAC 400Hz
The MWS including ECU and six sensors weighs 18,2 kg.
The MWS operating maximum temperature is 70°C.

Provided interfaces

The cockpit unit is provided with sufficient 28 VDC power.
Various aircraft discrete signals can be routed to cockpit unit, to be discussed.
Wiring in wing available to pod: 6 discrete wires, shielded wires suitable for data bus, 115VAC 400Hz power.

Pod

The pod structure, and if necessary, additional climate control must be purchased at sub supplier.

Dispensing

The power required to ignite a payload is up to 126W for a period of up to 20ms. The Digital Sequencer Switches (DSS) run on 28 VDC and each consumes 3W for operating power plus the power required to ignite the payloads. Each DSS can control 2 magazines.

Pricing

Units from own company can be redesigned to better suit the actual need. In general a redesign will add a non recurring development cost of 15 times the production cost.
For each percent the weight is reduced the cost is increased with two percent. For items ordered at sub supplier no development costs will be added be changing requirements. They are included in the offer made by sub supplier.

Production cost:

		Weight [kg]	Production Cost[DKR]
MWS complete		18,2	0
PCU		25	30.000
DSS		5	50.000
Dispenser assembly		3	5.000
Pod harness		20	100.000
Pod structure		175	2.000.000
Cockpit unit		4	112.000

Development cost:

Development costs	NA	4.000.000

The contract sum is 8.000.000 DKR
Your company's management expects a profit of no less than 15% and aims for 20%.