



Change of Camera

Terma Case for the Systems
Engineering course at Aarhus
University

TERMA[®]
ALLIES IN INNOVATION

Class:	PRS
Doc.no:	1034832-QE
Rev:	2A
Date:	2019-03-12
Approved:	MIW



Change of Scope

- The Royal Danish Airforce has decided that the Updated Reconnaissance Pod needs to be able to acquire infrared imagery in addition to the electro-optical imagery.
- This leads to a number of changes in requirements.





Cameras

	Camera 1 X-568Y	Camera 2 CA-268	Camera 3 DB110
Focal length	370 mm	250 mm	320 mm
Field of view	11.6913 deg	12.21 deg	11.4212 deg
Frame rate (swath 1 image wide)	Swath time 0.3 s	Cycle Rate (swath/s) 3.3333	Cycle Rate (swath/s) 3.3333
(swath 2 images wide)		1.6667	1.1764
(swath 3 images wide)		1.250	0.8003
(swath 5 images wide)		0.769	0.4878
(swath 10 images wide)		0.392	0.2469
Resolution	16470 mm	10000 mm	12080 mm
CCD physical size			64 * 64 mm
CCD pixels	16470 * 16470	10000 * 10000	12080 * 12080
Weight	22.5 kg	25 kg	65 kg
Pixel depth	10 bits	14 bits	12 bits
Physical size	500 * 450 * 450 mm	500 * 450 * 450 mm	998 * 550 * 550 mm
Power consumption	280 W	250 W	350 W
Price indication	USD 5500	USD 7400	USD 7500

Cameras



	Camera 1 X-568Y+IR		Camera 2 CA-268+IR	
	EO	IR	EO	IR
Focal length	370 mm	200 mm	250 mm	200 mm
Field of view	11.6913 deg	10.5121 deg	12.2148 deg	10.5121 deg
Frame rate (swath 1 image wide)	Swath time 0.6 s	Swath time 1.1 s	Cycle Rate (swath/s) 5.00	Cycle Rate (swath/s) 2.72
(swath 2 images wide)	2.7 s	4.6 s	1.818	1.069
(swath 3 images wide)	3.8 s	6.2 s	1.250	0.781
(swath 5 images wide)	6.0 s	9.0 s	0.769	0.549
(swath 10 images wide)	11.5 s	16.1 s	0.392	0.261
Resolution	217,39 lines/mm	121.28 lines/mm	186,915 lines/mm	121.28 lines/mm
CCD pixels	16470 * 16470	9216 * 9216	10000 * 10000	9216 * 9216
Weight	33.8 kg		37.5 kg	
Pixel depth	10 bits	14 bits	14 bits	14 bits
Physical size	750 * 450 * 450 mm		780 * 450 * 450 mm	
Power consumption	520 W		580 W	
Price indication	USD 9300		USD 11200	



Added and Changed Requirements

ID	Technical Requirements	Req. Type	Verif. Method	Change/Add
SLR-150	The pod shall be equipped with at least one of the following sensors: - XTS-365-18+IR - CA-265-12+IR	M	A	Change
SLR-181	The pod shall ensure that the temperature around the camera does not change at a rate higher than +/- 3 degrees Celcius per hour in order to avoid condensation when climbing from 0 to 10,000 ft with a climb rate of 50,000 ft/min.	M	A	Change
SLR-183	The pod shall be able to acquire electro-optical images with a footprint of 600x600 m and a ground resolution distance of less than 10 cm while flying at an altitude of 10 kft at a ground speed of 400 knots.	M	A	Change
SLR-152	The pod shall be able to acquire electro-optical images of an area with a size 6 km wide and 60 km long in a single flyover at an altitude of 15 kft at a ground speed of 350 knots without image overlap.	M	A	Change
SLR-182	The pod shall be able to acquire electro-optical images of an area with a size 6 km wide and 60 km long in a single flyover at an altitude of 15 kft at a ground speed of 350 knots with an image overlap of 55% in the line of flight.	D	A	Change



Additional Work

- In the analysis, it is required to also include the following results related to the IR camera
 - Footprint and ground resolution distance while flying at an altitude of 10 kft at a ground speed of 400 knots
 - Maximum ground area (swath imagery) covered in a single flyover at an altitude of 15 kft at a ground speed of 350 knots without image overlap
 - Maximum ground area (swath imagery) covered in a single flyover at an altitude of 15 kft at a ground speed of 350 knots with an image overlap of 55% in the line of flight.

Meet us at

www.terma.com

www.terma.com/press/newsletter

www.linkedin.com/company/terma-a-s

www.twitter.com/terma_global

www.youtube.com/user/TermaTV