Execution Order

for

Integrated Fixed Towers Demonstration

Version: Original

Date: 3 JAN 1212

Prepared by Nate Dibling, PMP

Ultra Electronics

Advanced Tactical Systems

4101 Smith School Road

Austin, Texas 78744

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Warning Execution Order: Ultra IFT System Trial and Demonstration:

1. Situation: Opportunity Overview: Integrated Fixed Towers: With the SBinet project shutdown, the U.S. government and the Department of Homeland Security have broken up the initial requirements for border security technology into several smaller projects under the Southwest Border Technology Solutions Initiative. One of the smaller projects will be to place Integrated Fixed Towers (IFT) along the Arizona border to provide ISR capability for USBP. The Customs and Border Protection's Office of Technology Innovation and Acquisition (OTIA) will be leading the acquisition of the Integrated Fixed Tower Solution. Ultra Electronics-Advanced Tactical Systems intends to integrate the best in class component suppliers for tower construction, surveillance sensors, remote power generation, and back-haul communications with our sensor integration and control system as a prime contractor for the Integrated Fixed Tower project. Ultra Electronics is seeking potential suppliers for Camera and Radar systems for the Integrated Fixed Tower Project.

A demonstration of this capability will be used to evaluate and compare solutions for camera and radar systems. In addition, the demonstration will be used as proof of capability for the Ultra Electronics team solution in preparation of the IFT proposal response.

a. Area of Operations: The demonstration will be held in Tucson, AZ. ***The specific locations are considered competition sensitive***, so these locations cannot be distributed outside of the intended recipient of this order. The locations for the demonstration include:

- Primary Demo: 10200 West Tangerine Rd, Marana, AZ 85653
- Alternate Demo: 9301 S. Swan Rd, Tucson AZ 85756
- ~~Potential Remote COP Site: 4115 West Illinois St. Tucson, AZ 85735~~

1. Terrain: The terrain of the demonstration site is indicative of the terrain in the focus areas of the IFT effort. It will be open and capable of LOS for radar and camera testing of over 9 miles.
2. Weather: The weather is currently unknown, but will be identified as the date of execution draws near. All systems will be tested in similar situations as much as possible. The light table for the period of the demonstration is shown below:

Table 1: Light Table 16 JAN - 27 JAN, 2012

Date	Sunrise	Sunset	Length of Day	Noon
Jan 16, 2012	7:25 AM	5:42 PM	10h 17m 12s	12:34 PM
Jan 17, 2012	7:25 AM	5:43 PM	10h 18m 20s	12:34 PM
Jan 18, 2012	7:25 AM	5:44 PM	10h 19m 30s	12:34 PM
Jan 19, 2012	7:24 AM	5:45 PM	10h 20m 43s	12:35 PM
Jan 20, 2012	7:24 AM	5:46 PM	10h 21m 57s	12:35 PM
Jan 21, 2012	7:24 AM	5:47 PM	10h 23m 13s	12:35 PM

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Jan 22, 2012	7:23 AM	5:48 PM	10h 24m 30s	12:35 PM
Jan 23, 2012	7:23 AM	5:49 PM	10h 25m 50s	12:36 PM
Jan 24, 2012	7:22 AM	5:50 PM	10h 27m 12s	12:36 PM
Jan 25, 2012	7:22 AM	5:51 PM	10h 28m 35s	12:36 PM
Jan 26, 2012	7:22 AM	5:52 PM	10h 30m 00s	12:36 PM
Jan 27, 2012	7:21 AM	5:52 PM	10h 31m 26s	12:37 PM

2. Mission: Ultra Electronics conducts an integration and demonstration of the Ultra solution for the Integrated Fixed Towers from 16-27 January, 2012 in Tucson, AZ in order to prove our teams capability to provide a technically compliant solution.

3. Execution:

a. Ultra's Intent: Our intent for this demonstration is to provide a representative system for testing and integration purposes. The Camera and Radar systems will be compared to identify the value of each system relative to the technical requirements. In addition, it is our intent to exercise the entire system as much as possible as a system level test of the functionality. This effort will begin with an initial integration phase and end with a demonstration phase that will allow us to compare and contrast the vendor solutions. The end state of the demonstration will be once Ultra has completed the final test and enough data is collected to make accurate decisions on the vendor proposed systems.

b. Concept of the Operation: The demonstration will consist of two phases: Integration and Execution. The Integration phase will be held in Austin, TX at the Ultra Electronics facility. The integration phase abegan 12 December, 2011 and runs through 13 January, 2012. The purpose of the integration phase is to confirm or establish system integration between your product and the Ultra Command and Control Systems' software, SAMS. The execution phase will begin 16 January, 2012 and run through 27 January, 2012. The purpose of the execution phase is to allow vendors to demonstrate their capabilities and to validate the overall systems performance of potential vendor products.

Participation in Phase 1 is completely voluntary for radar and camera vendors. It is certainly not a requirement if the components offered, have already integrated with Ultra SAMS, and you trust that the system will operate correctly during the demonstration.

During the Integration phase, potential IFT vendors are invited to bring their systems to the Ultra facilities in Austin, TX and conduct an integration exercise with the Ultra SAMS software that will be used to run the IFT system. Ultra will provide facilities, hardware, and personnel to support the integration of the system. Vendors are welcome to stay as long as required to complete the integration within the 12 December, 2011 to 13 January, 22012 time window. Each vendor must schedule with Ultra Electronics the dates and duration they would like to use for the integration. The period from 12 December to 13 January will be first come first served based on capacity of the integration lab at Ultra. Currently the Integration Lab space can accommodate up to six vendors at one period. Once receiving this notice, vendors may begin to request their desired dates with the Ultra POC undersigned below.

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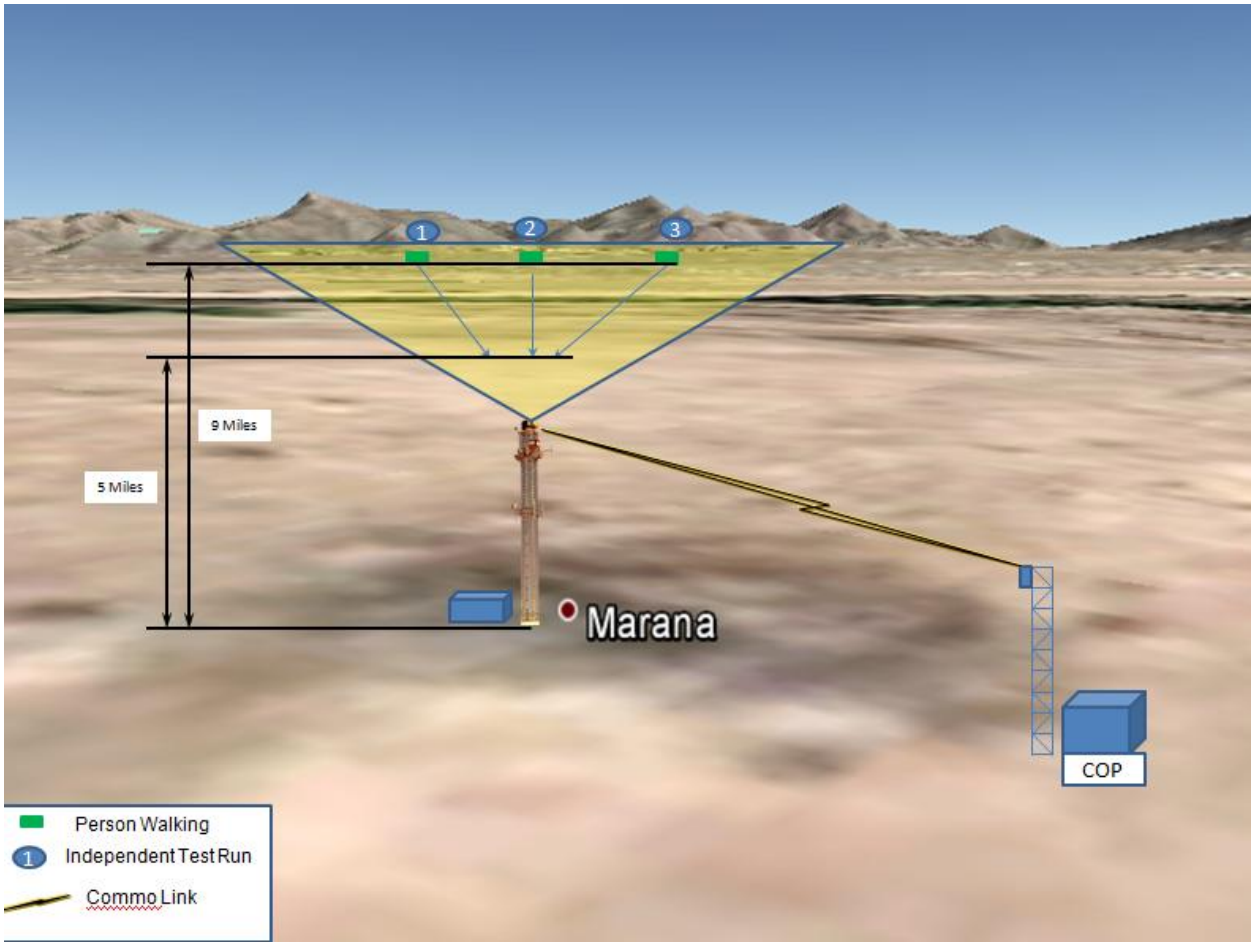
During the Execution phase potential IFT vendors will be evaluated based off the needs of the DHS and the CBP. The Execution phase will consist of three test trials. Each test trial will be equal in scope and purpose. Each test trial is scheduled for three days and will consist of a half day for setup and tear down. Each test period will test an individual radar system and multiple camera systems. A depiction of the demonstration concept is shown below in Figure 1. Based on the number of expected camera systems for the demonstration, Ultra plans to run all camera systems during each test with each radar candidate. If the total number of camera systems surpasses the capacity of the tower system then a rotation will be developed such that each camera system has an equal opportunity to demonstrate its capability.

Figure 1: Demonstration Concept



c. Technical Integration Information:

1. Camera Systems: The SAMS utilizes a proprietary conversion box call the SIPR. The video output from the camera can be NTSC/PAL composite with AGC for input into SIPR who will do the multicast. The video can also be multicast on to LAN with H.264 compression. For control the system can utilize IP to SIPR which converts the IP to RS-422 or the control can be IP to camera in the supported protocols.

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The Camera Information Server in the SAMS software currently supports the following protocols:

- SiSS
- MIC
- Visca
- Pelco-D
- Pelco-P
- FLIR-STAR-SAFIRE
- Chess-Cobra
- Chess-Piranha
- Thales-Cathrine
- Thales-CELT2
- Thales-TIM-VGA
- UECCS 2125
- ULTRA-RADAMEC

The following is a list of cameras that are currently integrated with the CIS:

Table 2: SASMS supported cameras

Camera	Protocol
C2000 (Colour, Thermal)	SiSS
C2000 with Range Finder (Colour, Thermal)	SiSS
Remover (Colour, Thermal)	SiSS
UMC MAIN1200	SiSS
UMC CONT85	SiSS
UMC OCR	SiSS
UMC THERMAL	SiSS
UMC STARLITE	SiSS
UMC ADIR	SiSS
LRS3000 (Thermal, XY, Pan/Tilt)	SiSS
Indigo ForwardVision (Colour, Wash)	MIC
REVIVER (Colour, Thermal, Lowlight)	Reviver2
Sony Rz30	Visca
Sony Hd1Ev1	Visca
PelcoD BoschAutoDomeEasyII	Pelco-D
PelcoP BoschAutoDomeEasyII	Pelco-P
FLIR Star SAFIRE II (Colour, Thermal)	FLIR-STAR-SAFIRE
PelcoD UV97Cyclops (Colour, Thermal)	Pelco-D
PelcoD JM612Pirate (Colour, Thermal)	Pelco-D
Chess Cobra EO Director	Chess-Cobra
Chess Piranha26 v1	Chess-Piranha
Thales Catherine MP	Thales-Catherine
Thales CELT2 LRF	Thales-CELT2
UECCS 2125	UECCS 2125
Thales TIM VGA	Thales-TIM-VGA
General Dynamics FLIR PT-307	PELCO-D
KylmarMREO (Colour, Thermal)	SiSS
UltraRadamec	ULTRA-RADAMEC
WASP (Colour, Thermal)	SiSS

2. Radar Systems: The radar is a unique interface to each specific vendor. The radar systems already supported by the SAMS software include the following:

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Table 3: Ultra Supported Radar

Radar type
Raytheon Mk2
Blighter Mk 202
ICX 1400
KH Sharpeye
Raytheon Mk2
Sperry Bridgemaster
Furuno FR2155
JRC
Blighter 420
Blighter 410
Blighter 303
ELTA V5
Terma Scanter 4000
Elta V10
ARPA NMEA (TTM tracks)
SAAB Giraffe (3 Versions)
Syracuse LCMR AN/TPQ-48
Elta V2.5

Additional System level information is contained in Annex A (a system diagram for the demonstration).

3. System Network Diagram:
4. Physical Connection Diagram: See Annex B

d. Concept of Test: Trials will be run during hours of night, dawn, dusk, and day to determine the performance of the system in each light environment. The trail will include a single person walking from 9 miles away from the sensor to 5 miles away. The radar will be used to identify the objects presence and the objects location. The camera system will be used to identify the type of object (i.e. can the operator of the COP determine that the tracked object is a single person walking). Each trial will take approximately 140mins which includes 30 mins for preparation, 80 mins for execution and 30 mins for reset. This assumes that the average walking rate of a person is approximately 20 mins per mile. This test will be run multiple times throughout the trial. The total number of tests will be dependent on the overall performance of the systems. Trials during a test period shall be run according to the schedule listed below:

Day 1 (times are approximate and will be based on light tables)

Noon to 5pm Day trials
5pm to 7pm Dusk trials
7pm to 10pm Night trials

Day 2

6am to 8am Dawn trials
8am to 5pm Day trials
5pm to 7pm Dusk trials
7pm to 10pm Night trials

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Day 3

6am to 8am Dawn trials

8am to 12pm Day trials

e. Requirements of Test:
    1. Ultra's system utilizes the ground surveillance radar (GSR) as the primary means of detection of IOIs. As such the GSR must be able to detect a single walking, average-sized adult human at a range of up to 7.5 miles under the following conditions: daylight and darkness, line of sight ranging from clear to partial obstruction (50% to 95% blockage of the individual for periods of 1-3 seconds.), and sustained wind speeds up to 10 MPH (Ultra will be unable to test against the wind speeds exactly, but atmospheric data will be collected during the test.).
    2. Ultra's system must provide video of sufficient quality, and resolution to enable an operator to determine that a single, walking, average-sized adult is a human; at a range of up to 7.5 miles relative to each individual IFT, under the following conditions: daylight and darkness, line of sight ranging from clear to partial obstruction (50% to 95% blockage of the individual for periods of 1-3 seconds.), and sustained wind speeds up to 10 MPH (Ultra will be unable to test against the wind speeds exactly, but atmospheric data will be collected during the test.).
f. Selection of Vendor Criteria: This test will assist Ultra in choosing the correct vendors for the overall IFT solution. For the IFT solution vendors will be chosen based on five criteria: technical assessment, price, integrated logistics support (ILS), past performance, and overall relationship. Technical assessment and price are equal in weight and are greater than any other criteria. ILS will be counted as the second highest importance but still less than technical or price in the overall weighting. Past performance will be third in priority and is weighted less than the technical, price, and ILS. Relationship is the least weighted criteria. Selection does not guarantee final use in system or a contract award. Ultra reserves the right to make multiple awards or no award.
    1. Technical assessment is scored based on the systems ability to meet the DHS's IFT Requirements.
    2. Price is scored based on the cost of a system compared to its competitors.
    3. ILS is scored based on the supplier's ability to meet the IFT ILS requirements and the ability to provide a decided advantage to the Ultra team for long term support.
    4. Past performance is scored based on the suppliers past performance in delivering similar or identical systems as it relates to technical performance, quantity, quality, and schedule.
    5. Relationship is scored based on the overall relationship developed between the supplier and Ultra. This is a subjective rating and scores the ability of the supplier to work as an integral and successful part of the Ultra team.
g. Tasks to Team Members:
    1. Granite:
        a. Provide facility and base support to the demonstration

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b. Provide the structure to mount the sensor systems and the comms antenna at the demonstration site. The mounting system is a lift that allows the team to quickly lower and raise the systems to the desired height.
c. Provide Commercial Power at the structure site
d. Provide Power connection at the mounting site of the lift basket
e. Provide a facility for a COP to be established on site with the structure and at another alternate site (remote COP) to be determined to allow for testing of the communications facility. (More information will be provided on this task ASAP)
f. Assist vendors with mounting systems onto the structure
g. Provide walkers for trials
h. Assist with the execution of the test. See ANNEX C for Setup Procedures.

2. L3 Communications West
   a. Ensure integration with the Ultra SAMS software prior to demonstration execution
   b. Provide Communications system capability for the demonstration
   c. Define the minimum requirements needed to prove system
   d. Request necessary permissions for communication systems from FCC
   e. Assist with the execution of the test. See ANNEX C for Setup Procedures.

h. Tasks to Vendors
   1. Provide system either radar or camera sensor for integration and demonstration.
   2. Ensure that the system to be tested is integrated with the Ultra SAMS software prior to traveling to the trial. Coordinate with Ultra in order to set up integration time at the Ultra facility.
   3. Request required special equipment/facilities/considerations from Ultra no later than 16 DEC 11.
   4. Provide Ultra with specifications and requirements for any system requires FCC approval or other government approval for operation no later than 16 DEC 11. If the vendor wishes to request the permission that is also acceptable.
   5. Provide a sufficiently sized team to the trial site to ensure the successful operation of your system.
   6. ~~Provide sufficient cabling to mount the system at 120 ft above the surface and connect to a Ultra System no more than 30ft from the base of the tower.~~ Provide 8ft power cable with a 120VAC connection, an 8ft BNC (or video connection) cable for connection to the SIPR and 8ft RS-422 cable for the control connection to the SIPR.
   7. Commercial Power will be available on site. Ensure that the system you bring for the test has the necessary ancillary equipment in order to draw power from a standard 120VAC system.
   8. Ensure that system can mount to the specified mounting hardware. ~~(The mounting hardware specifications will be distributed NLT 15 DEC 11.)~~ Mounting is described in Annex B.
   9. Maintain accountability of your system during the periods it is not in use or not mounted.

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10. Enable the execution of the system test. See Annex D

i. Tasks to Ultra

1. Prepare 2nd warning order for execution and issue to vendors and team members NLT 16 DEC 11.
2. Prepare final plans for demonstration and issue to vendors and team members no later than 6 JAN 12.
3. Prepare and host vendors at Ultra facility for integration with the Ultra SAMS software.
4. Request all necessary permissions for radar transmissions from the FCC
5. Facilitate and lead the demonstration on site (more refined tasks are still to be determined)
6. Provide a network switch and SIPRs at the mounting site of the scissor lift.

j. Timeline:

22 NOV 11:	Update on demonstration released
3 DEC 11:	Detailed plan for IFT demonstration released
12 DEC 11:	Integration Phase begins**
15 DEC 11:	Warning Execution Order 2 released
6 JAN 12:	Demonstration Update and Finial Schedule
13 JAN 12:	Integration Phase ends
16 JAN 12:	Demonstration Travel and Ultra site setup
17 JAN 12:	Vendors Travel and Ultra site setup
18-20 JAN 12:	Test Trail 1
21-23 JAN 12:	Test Trail 2
24-27 JAN 12:	Test Trail 3
27 JAN 12:	Ultra break down

**Note: Ultra's offices will be closed for the Christmas holiday from 22 December through 26 December 2011, and for New Year's Day on 2 January 2012.

4. Support:

a. Financial Support: Ultra is not providing compensation or reimbursement and will have no obligation of payment to any party participating in this demonstration. Each party participating in the integration and demonstration will bear all costs, risks and liabilities incurred by it arising out of its obligations and efforts under effort during the demonstration, pre-proposal and proposal periods.

b. Lodging Support: ~~Ultra will send a suggested Lodging List to all traveling parties in the Warning Execution Order 2.~~ List of suggested hotels is listed below:

- Holiday Inn Express Hotel & Suites MARANA: 8373 CRACKER BARREL ROAD, MARANA, AZ 85743
- Fairfield Inn & Suites Tucson North/Oro Valley: 10150 North Oracle, Oro Valley, AZ 85737
- La Quinta Inn & Suites NW Tucson/Marana: 6020 W Hospitality Road, Tucson, AZ 85743
- Days Inn and Suites Tucson/Marana: 8370 N Cracker Barrel Rd, Tucson, AZ 85743

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c. Transportation: Ultra will provide transportation for the walking individuals to transport them to and from the start and finish line for the trials.

5. Communications:

a. Radio: The primary means of communication onsite for all personnel involved in running and executing the test will be via radio. Ultra will provide key personnel radios to ensure communication between them.

b. Cell Phone: The secondary means of communication while on site will be cell phone for all support and ancillary staff and participants. Key Ultra Contacts for the demonstration will be

- Evan Corwin: 512-940-1736
- Nate Dibling: 512-592-8566

c. Programmatic: All programmatic and execution questions please refer to the POC undersigned or Evan Corwin at evan.corwin@ultra-ats.com.

d. Subcontracts: All sub-contractual issues please refer to Lori Thomas at lori.thomas@ultra-ats.com or Matt Rohwer matt.rohwer@ultra-ats.com.

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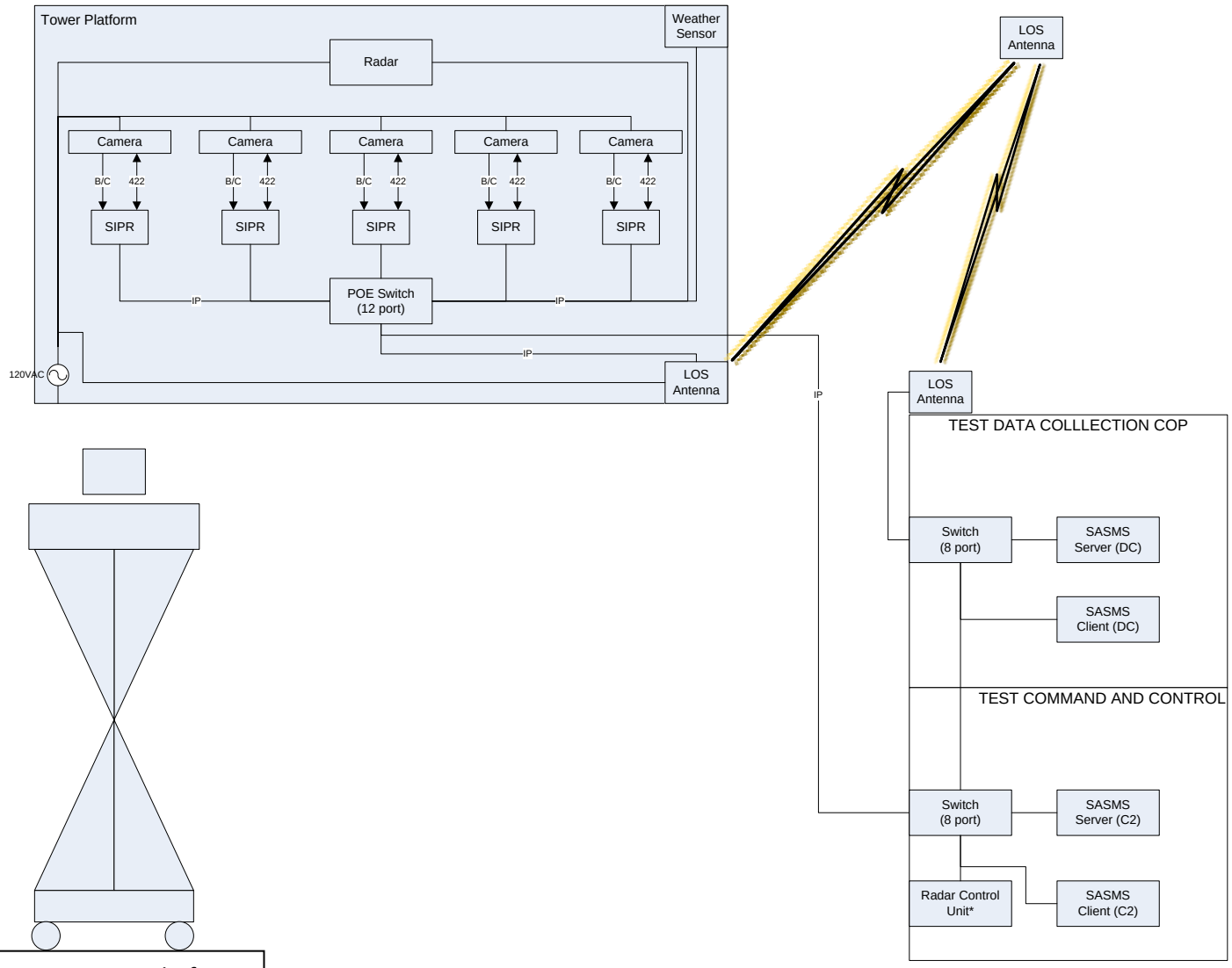
Annex A: Demonstration Network Diagram



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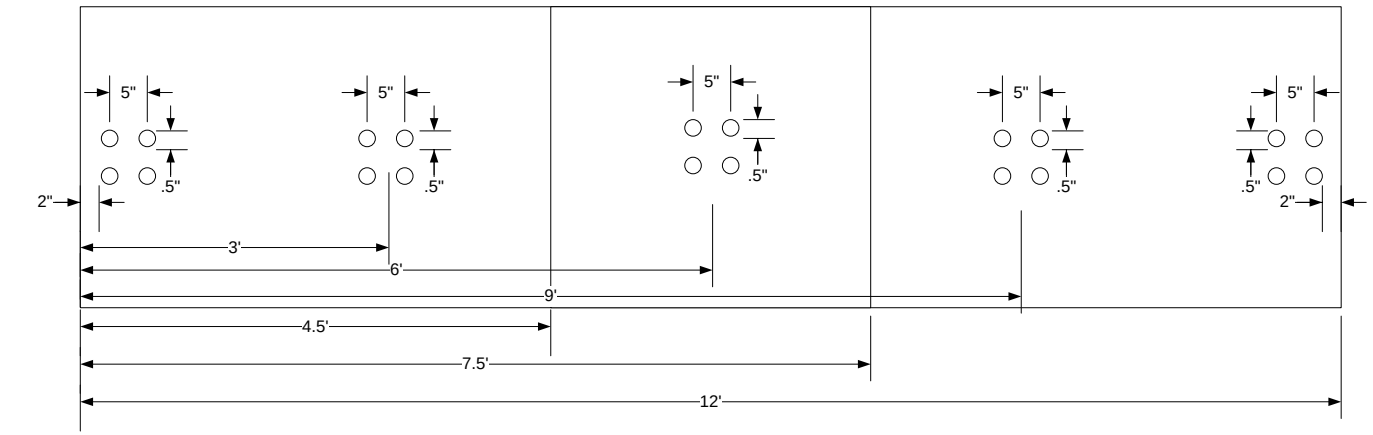
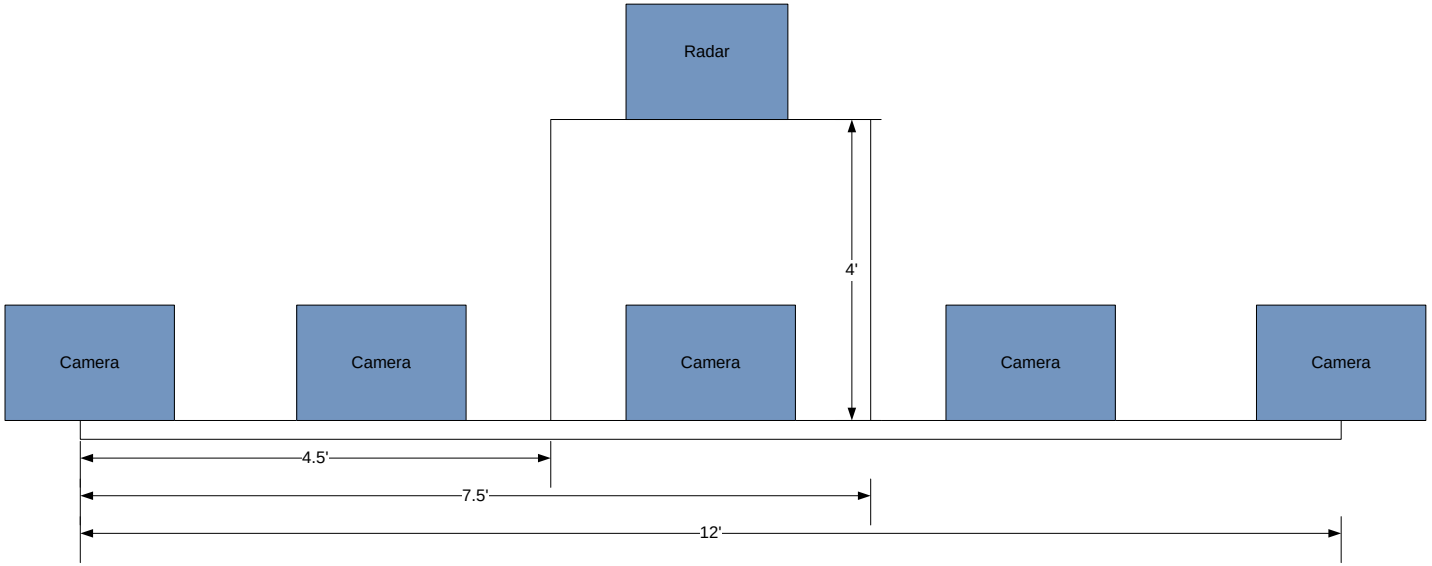
Annex B: Demonstration Network Diagram





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Ultra ELECTRONICS

IFT Demonstration Test Procedures

Ultra Electronics
Advanced Tactical Systems

Trial Number _____ Date _____

Test Run _____ Start: _____ End: _____

Sensors to be tested:

Environmental Conditions: Start: Finish:

√		Task	Responsible	Completion Time/Notes
	1	Install and Connect Camera Sensors to SIPR machine	Ultra/Vendor/ Granite	
	2	Install and Connect Radar to network switch	Ultra/Vendor/ Granite	
	3	Ensure Connectivity via LOS network	L3	
	4	Ensure Control fo Sensors via SAMS	Ultra	
	5	Deploy walker with pack at 9 miles	Ultra	
	6	Setup COP with sensor feeds and map	Ultra	
	7	Record Atomspheric and Weather Data at the beginning of the test	Ultra	
	8	Begin recording software	Ultra	
	9	Initiate Test: Walker moves from start to finish	Ultra	
	10	Walker calls in at each check point	Ultra	
	10	Continue to ensure recording of the SAMS machine	Ultra	
	11	Complete Test: Walker reaches finish	Ultra	
	12	Turn off recording and save file in demonstration folder marked with the trail and the test number	Ultra	
	13	Record Atomspheric and Weather Data at the end of the test	Ultra	
	14	Lower lift and disconnect sensors	Ultra/Vendor/ Granite	
General Observations:				

Position: _____

Completed By: _____

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Annex D: IFT Demonstration Test Set Up Procedures

Ultra ELECTRONICS

IFT Demonstration Test Set Up Procedures

Ultra Electronics
Advanced Tactical Systems

√		Task	Responsible	Notes
	1	Set up SAMS computers	Ultra	Local and Remote
	2	Set up LOS Microwave Network	L3	
	3	Deploy Lift	Granite	
	4	Install sensor mount on lift	Granite	
	5	Provide 120VAC Power connection on the lift basket	Granite	
	6	Install network switch and SIPRs on lift	Ultra	
	7	Set up and connect Weather Sensors on tower and network	Ultra	
	8	Connect switch to LOS microvae netowork	Ultra/L3	
	9	Install switch and connect network to SAMS Computers at operations center	Ultra/L3	
	10	Mark off start points	Ultra	
	11	Mark off end points	Ultra	
	12	Mark off 1 mile check points between start and end	Ultra	
	13	Set up radio net	Ultra	

NOTES

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