GROUND Since1999 그라운드
GROUND CO., LTD. KOREA

eca3G

Perfect-Integrated Lightning Surge Protection Solution

KEY PERFORMANCES

the 3rd Generation Digital Grounding Apparatus
for Perfect Lightning Surge Protection
without burying Ground
US PATENT 7,652,865 B2 SIRIM TEST : IEC 61643-1

GROUND CO., LTD

- CONTENTS -

SURGE DAMAGES

88.3% of electronic equipment' troubles with unknown reason are by **surge**

Equipment damages (Degradation of components)	Repeated surge impacts are accumulated, make sudden system down. * Card frequently changed (damaged) * Faulty channel * Loss of circuit insulation * shortening of component life span * Burn-out : system down / system failure
Operation error	* frequent mis-operation of equipment , * ELCB trip * Sudden unnecessary out-put, Reset, Mode change are occurred
Power supply unit damages	* Semi-conductor (SMPS etc) for power supply unit are damaged * Surge pass through 'Linear power supply unit" damages internal components of equipment* DC power system trip (Rectifier Trip) * Power supply trip
Communication line & Signal line troubles	* Intruded surge into communication line / signal line affect Input / Output systems system halted, * Arc is occurred at Signal track, make damages * Faulty with unknown reasons at communication / signal control
Various Surge affects to electronic devices	* PCB damages , * Data transmission error * Memory damage-Random system halt * Hard Disc damages * SCR (Thyristor) damages * Process error * Power supply unit damage, power supply trip * Program shut-down

INTRODUCTION

*** eca3G (ɛka three G) is :**

- **E**nergy **C**onversion **A**pparatus **3**RD **G**eneration
- US Patent : Grounding Device not need to be buried in Ground
  (**US PATENT 7,652,865 B2)**
- Total Integrated surge protection solution with grounding, equi-potential function
- Multi functional & Multi-coverage with Grounding + SPD+ Integrated Protection

*** Increasing Damages of Electronic Systems**

- Exposed to increase of more Lightning upon Global warming (multi step lightning)
- Advanced systems adopt more **IC** chips for Automation, Integration, Networking
- Integration level of IC chips higher => weaker Resistance from external surges.

*** Right understanding for Lightning Protection Systems**

- Lightning Arrestor for physical strike damage, not protect electronic system.
- NOT Low earthing resistance => Proper Grounding system
- SPD cannot protect surges from ground, water pipe, conductive structures

.

*** eca3G is the SOLUTION** for ***WHY SYSTEM EQUIPMENT STILL DAMAGED even AFTER INSTALLING ALL TYPES of Surge PROTECTION DEVICES for*** electronic, electrical, communication, telecommunication, automation systems, data center, broadcasting & radar systems, and so on including mobile shelters.

Hydro-Power Dam security of Korea Hydro & Nuclear Power Co., Ltd (KHNP)
http://www.khnp.co.kr/index_en.jsp

Integrated Surge Protection with eca3G for Hydro-Power Dam CCTV Surveillance System

Hwacheon Hydro-Power Dam

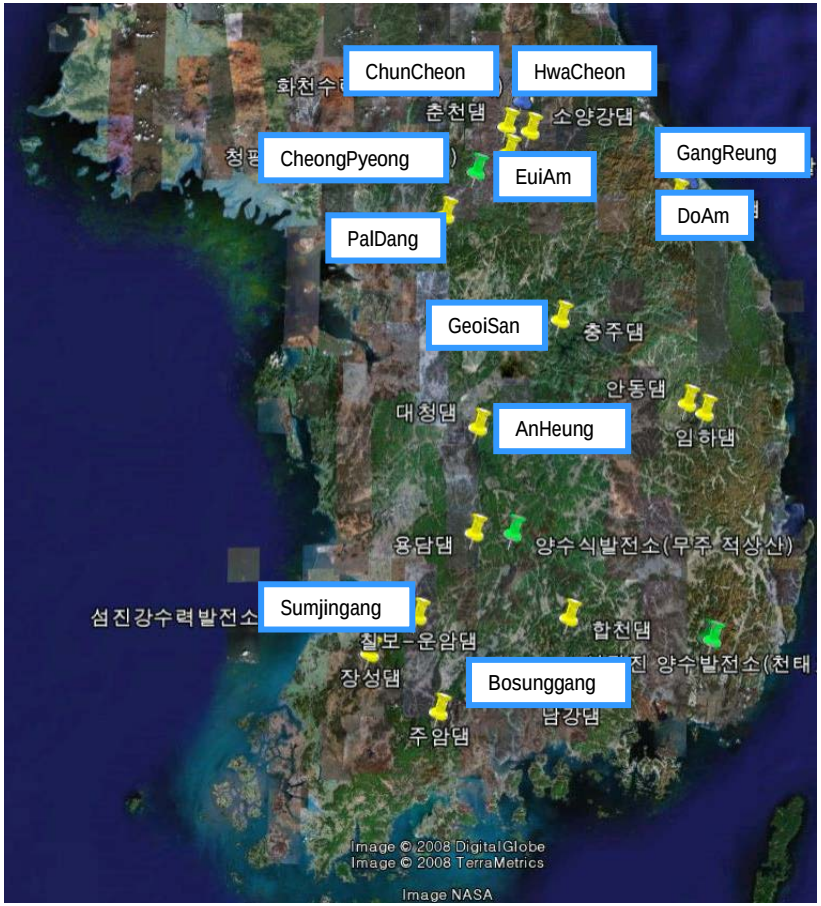
YongGwang Nuclear Power

Lightning Surge Protection for Korea Hydro & Nuclear Power Co., Ltd

Hydro-power Dam surveillance system SURGE PROTECTION

11 Dams with 170 nos of eca3G National Security Sites

Hydropower DAM	Province
HwaCheon Dam	Gangwon
ChunCheon Dam	Gangwon
EuiAm Dam	Gangwon
CheongPyeong Dam	Gyunggi
PalDang Dam	Gyunggi
GangReung Dam	Gangwon
DoAm Dam	Gangwon
GeoiSan Dam	ChungBuk
AnHeung Dam	Gangwon
Sumjingang Dam	JeonBuk
Bosunggang Dam	JeonNam
for 11 Hydro-power Dams	



KHNP CheongPyeong DAM – installed eca3G List

a. eca3G-LM model List

Site	Location	MODEL	Q'ty	Remark
Main Gate	CCTV MONITOR	SM-12-20-60M	1	
	Indoor DB	LM-33-20-60M	1	SUS Box
Guard House	Indoor DB	LM-33-20-60M	1	SUS Box
Downstream Guard	Indoor DB	LM-12-20-60M	1	SUS Box
	Water Intake / DB	LM-12-20-60M	1	Anchor Fix
HoMyung Lake	Substation/ DB	LM-12-20-60M	1	Anchor Fix
	Water Level Test/ DB	LM-33-20-60M	1	Anchor Fix
	Workshop / DB	LM-12-20-60M	1	SUS Box
Rest house	Guide house / DB	LM-33-38-60M	1	SUS Box
	TOTAL		9 sets	

b. CheongPyeong DAM – installed eca3G LP Model / PGS SPD List

N0	Location	eca3G LP	Video SPD	DATA SPD	Remark
1	Fan room Roof CCTV	1	1	1	
2	Main access Guard house Roof CCTV	1	1	1	
3	Main access road Junction CCTV	1	1	1	
4	Water Discharge house Roof CCTV	1	1	1	
5	Watch tower CCTV	1	1	1	
6	Outside CCTV	1	1	1	
7	Water discharge point CCTV	1	1	1	
8	Sanji Guard House CCTV	1	1	1	
9	Solar cell computer	1			
10	Water intake CCTV	1	1	1	
11	Tunnel Inlet CCTV	1	1	1	
12	Water level testing room CCTV	1	1	1	
13	Dam road CCTV	1			
14	Sanji domitary CCTV	1	1	1	
15	Instruments room CCTV	1			
16	HoMyung Lake rest house CCTV	1			
17	Building for instruments, Level checking	1	5	4	
19	Guard : Sanji, Main gate, Aces, 2FL, Downstream	2	16	6	
	TOTAL	19	27	22	

HwaCheong Dam : eca3G Installation


Tank monitoring CCTV & eca3G


Downstream monitoring CCTV & eca3G


Dam CCTV & eca3G S/S Roof CCTV


Pump room Roof CCTV Dam control system

ChunCheon Dam : eca3G Installation

Bridge Road guard CCTV

Dam downstream CCTV

Communication Room

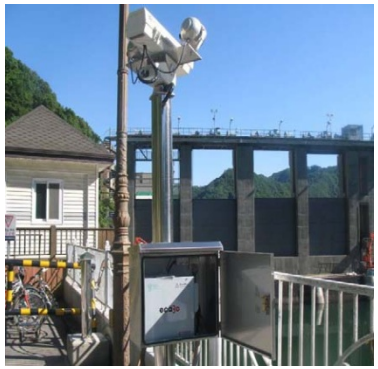
Substation CCTV

Warehouse Roof CCTV

Discharge Alarm system

Bridge CCTV

EuiAm Dam : eca3G Installation



Water level monitoring
CCTV

Main gate
CCTV

Bridge Road
CCTV

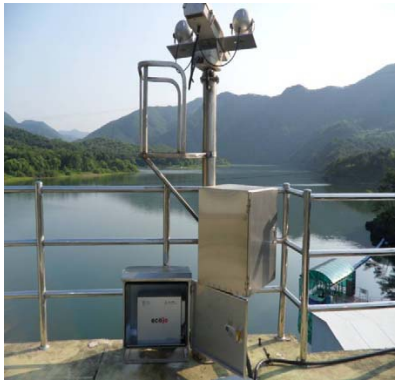
Rear Gate
CCTV

Dam upstream
CCTV

Communication
Room

GeoiSan Dam : eca3G Installation

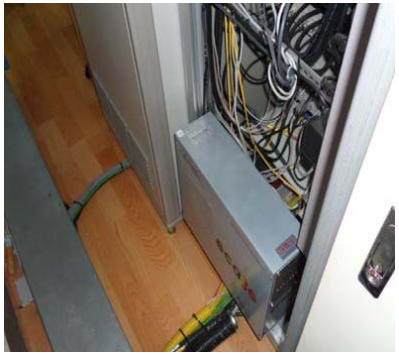
Building Roof gate CCTV



Water level monitoring CCTV

Downstream monitoring CCTV

Dam Discharge monitoring CCTV



Dam Control Room

Communication Room

Integrated Surveillance System for Royal tombs of the Joseon Dynasty
- UNESCO World Heritage Site
http://whc.unesco.org/en/list/1319

Perfect surge protection with eca3G for the Integrated Surveillance System (with CCTV) for 30units of Royal Tombs of the Joseon Dynasty

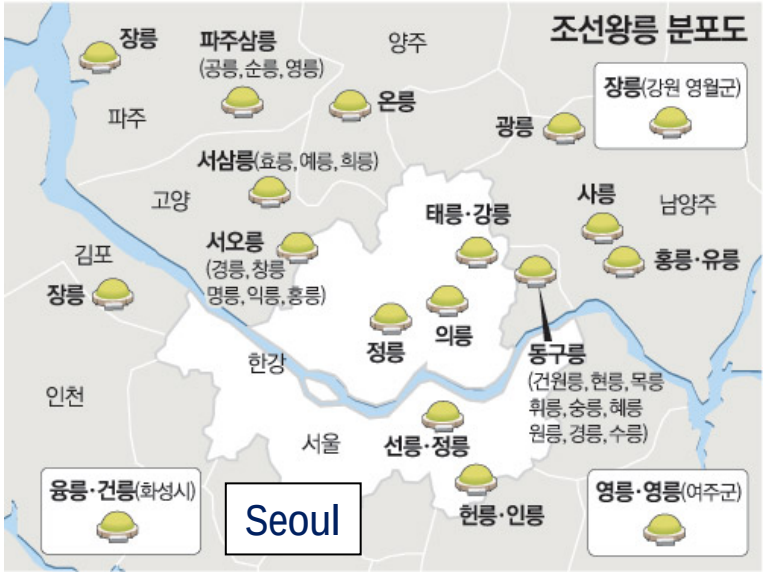
The Joseon Dynasty of Korea (519 years at 1392 ~1910) left many Royal Tombs (for Kings, Queens) with good condition, mostly located near to Seoul .
These Royal tombs are registered as UNESCO World Heritage . And Government installs Integrated Surveillance System (include CCTV) to protect the World heritage.
240 units over <eca3G> have been installed to provide perfect surge protection for the system.

The Royal Tombs of the Joseon Dynasty form a collection of 40 tombs scattered over 18 locations, built over five centuries, from 1408 to 1966

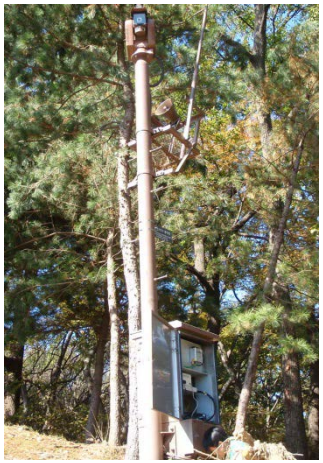
for 30 Royal Tombs
with 240 eca3G
* Duration : 2010. 6 ~ 11
* Provide USD2mil PL Insurance

West (10)	East (13)	Central (7)
YungGeonR	GwangR	Younghwiwon
JangR(K.P)	Hikyungwon	EuiReung
SeoSamR	Sunganwon	TaeReung
OnReung	Youngbin	JeongReung
GongsunR	Anbin	Yunsangun
Soryungwon	SaReung	HeonReung
Sugilwon	Gwanghaegun	SeonReung
JangR(P.J)	Seongmyo	
SeoReung	HongYuR	
YounHwoiwom	DongGuR	
	Myungbin	
	JangReung	
	YoungReung	*R: Reung=Tomb

[Royal Tombs Map]



[The Royal Tombs of the Joseon Dynasty]





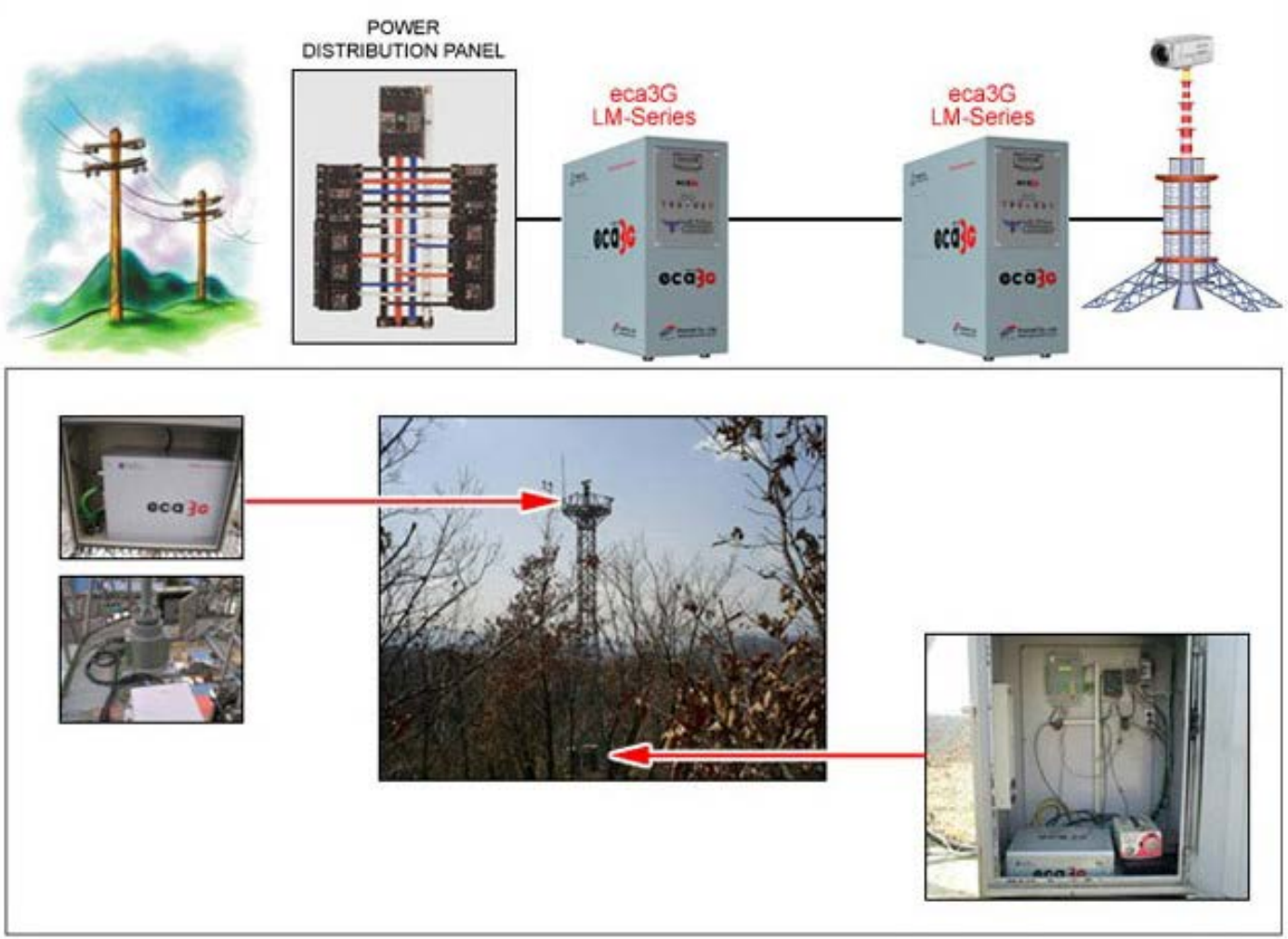
Integrated Surge Protection with eca3G for Unmanned Forest Fire Monitoring System

Year	Project Owner	Location	Remark
2008	Inje County	Ganwon Province, InJe	
	Forest Develop Institute	Ganwon Province, ChunCheon	GangWon
2009	GoSeong County	Ganwon Province, GoSeong	
	DongHae City	Ganwon Province, DongHae	
	Inje County	Ganwon Province, InJe	
	Forest Develop Institute	Ganwon Province, ChunCheon	
	GangReung City	Ganwon Province, GangReung	
	HeoingSeong County	Ganwon Province, HeoingSeong	
	PyungChang County	Ganwon Province, PyungChang	
	YangGu County	Ganwon Province, YangGu	
	WonJu City	Ganwon Province, MunMak	
	ChunCheon City	Ganwon Province, ChunCheon	KeumByung Mt
	HongCheon County	ChungNam Province,	BaekWoo Mt
	YoungWol County	Ganwon Province, YoungWol	KukJi Mt
	PyungChang County	Ganwon Province, PyungChang	
	TaeBaek City	Ganwon Province, TaeBaek	

강원도 소방본부 Gangwon Fire Headquarters

- GangWon Province Fire Service Head Quarters

[eca3G Installation for Unmanned Forest Fire Monitoring System]



[Unmanned Forest Fire Monitoring System]

CCTV

Relay Station

Monitoring Center

[DongHae city - Unmanned Forest Fire Monitoring System]

CCTV Tower bonding

CCTV bonding

eca3G installation

[YangGu County - Unmanned Forest Fire Monitoring System]

eca3G installation

eca3G installation

CCTV bonding

Fence bonding

[HeoingSeong – Kuksa Mt, Unmanned Forest Fire Monitoring System]

CCTV Tower

eca3G installation

Tower bonding

[HeoingSeong – Suri Mt, Unmanned Forest Fire Monitoring System]

CCTV Tower

eca3G installation

Tower bonding

Integrated Surge Protection with ecaBG

for Army Scientific Perimeter Surveillance System

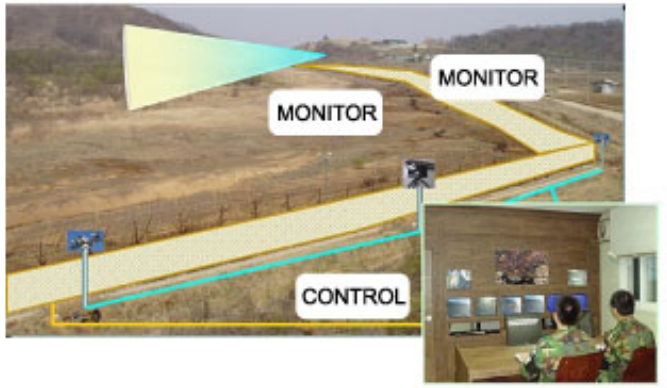
Korean Army plans to install Unmanned Perimeter Surveillance System for Army Airbase, Ammunition Depot until year 2016, and already installed Scientific Perimeter Surveillance System at 9 places (Army Airbase, Ammunition Depot etc) at 2010.

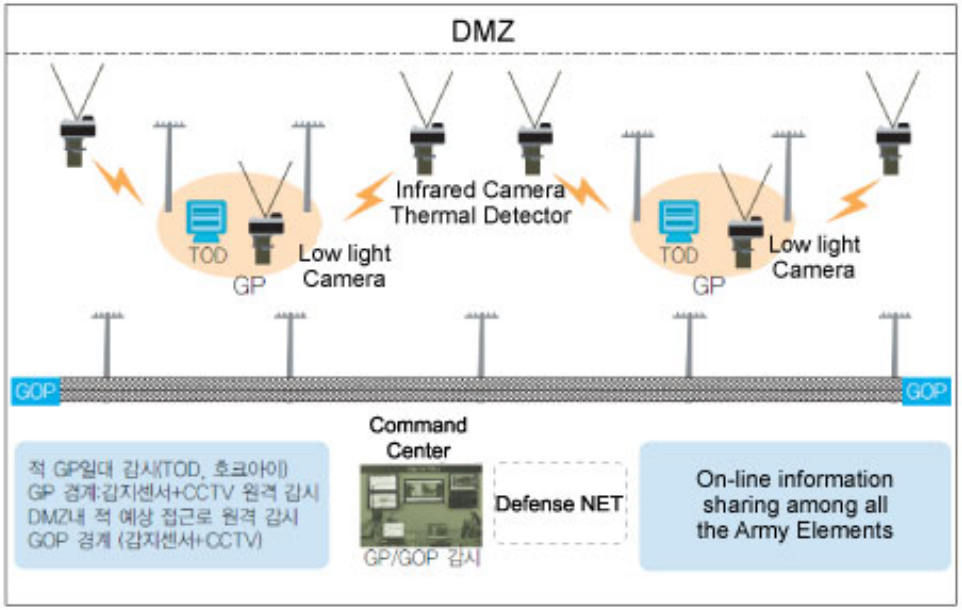
< Army Scientific Perimeter Surveillance System > is to adopt high performance CCTV, Optical sensors, computers for intrusion detection, and generate alert . This system is installed at DMZ area for GOP (General Out-Post at DMZ) sites , and will be installed at all the GOP sites until 2015.

This system is the integrated system of various electronic systems and sensors which are very sensitive from surge attack.

[DMZ : De-Militerized Zone / Boarder Line Intrusion Detection]

[Army Scientific Perimeter Surveillance System]





[System for GP / GOP- DMZ]

[Ammunition Depot Surveillance System - eca3G Installation]

[Korea Combat Training Center]

The KCTC was established April 2002 to manage KCTC battalion-level training, develop concepts, construct systems of brigade-level training and support combat experiments related to the Republic of Korea Army reorganization. Training at the CTC is scenario driven and heavily monitored in a control room where instructors are able to watch real-time combat situations unfold.

The status and location of casualties can be determined by sensors attached to each Soldier's uniform.

Perimeter Surveillance System for the President Office

* Capital Defense Corp , 2ND Battalion, SamCheong Post

Presidential Office : Total Lightning Surge Protection plan (Dec. 2010)

To prevent lightning surge damages/errors on Scientific Perimeter Surveillance System (CCTV, Sensors, Alarm), Wired-Wireless call system, CBR alert system (Chemical / Biological / Nuclear welfare) communication system, examine, measure, diagnose the overall surge protection structures, and complete total protection plan.

Diagnosis

1) Under KS C-IEC standard, examine detail power distribution network of whole perimeter surveillance system to make common grounding .
2) Measure potential of Neutral and G for equi-potential status.
3) Check ready installed PGS-eca3G status.

Inner camera of castle
- potential 1.057V

SPD & G terminal of Detector /
Alarm - potential 12.23 V

Shield of signal cable – G
- potential 19.5 V (not grounded)

To prepare budget for eca3G based total surge protection system at 2011

24 Hours Operation Support !!!

24 hours Operation under bad weathers
NAVY-MARINE facility protection
5 Yellow Sea Islands

<ROKS Cheonan> was sunk by a torpedo launched by a North Korean Yeono class miniature submarine near to Baekryeong Island / March 26. 2010,

Smoke is seen at Yeonpyeong island near the border against North Korea, in South Korea.
- Yeonpyung island shelled by North Korea / Nov 23. 2010

5 Yellow Sea Islands

<GROUND Co.> has performed PGS surge protection grounding system for 148 Navy sites during past 10 years, has supported perfect 24 hours operation. Navy/Marine systems in 5 Yellow Sea Islands are also protected by Ground's Solution.

After North Korea's bombing attack to Yeonpyeong Island at Dec 2010, many <eca3G> has been installed more together with new radar/electronic systems of Navy – Marine in 5 Yellow Sea Islands. <Ground> system now is the technical Standard of Surge protection in NAVY

Baekryeong -Island / Daecheong-Island / Socheong-Island / Yeonpyeong- Island / Woo- Island

5 Yellow Sea islands
Baekryeong / Daecheong-Island

The ROKS Cheonan sinking occurred on 26 March 2010

ROKS Cheonan (PCC-772) was a South Korean 1,200 tonnes-class corvette, commissioned in 1989.
On 26 March 2010, it broke in two and sank near the sea border with North Korea. The 1,200 tonne ship started sinking at 21:20 local time about 1 nautical mile (1.9 km) off the south-west coast of Baengnyeong Island in the Yellow Sea.The island is located on the South Korean (ROK) side of the Northern Limit Line, the *de facto* boundary dividing South from North Korea (DPRK).The ship had a crew of 104 men at the time of sinking, and a total of 58 crew were rescued. Another 46 crew were dead . An investigation conducted by an international team of experts from South Korea, United States, United Kingdom, Australia, and Sweden concluded that *Cheonan* was sunk by a torpedo launched by a North Korean Yeono class miniature submarine

5 Yellow Sea Islands

Yeonpyeong / Woo- Island

Attack on South Korea island

North Korea fired dozens of artillery shells at the South Korean island of Yeonpyeong, killing two soldiers and two civilians, and setting houses ablaze in the worst attack on its neighbor since 1953.
North Korea fired dozens of artillery shells at the island on 23 November. 2 :34 pm

[Baekryeong-Island NAVY]

Control Center

Control Center

Electronic Warfare vehicle

[Daecheong-Island NAVY]

Communication Room

Control Center

Climbing to the Center

[SoCheong -Island NAVY]

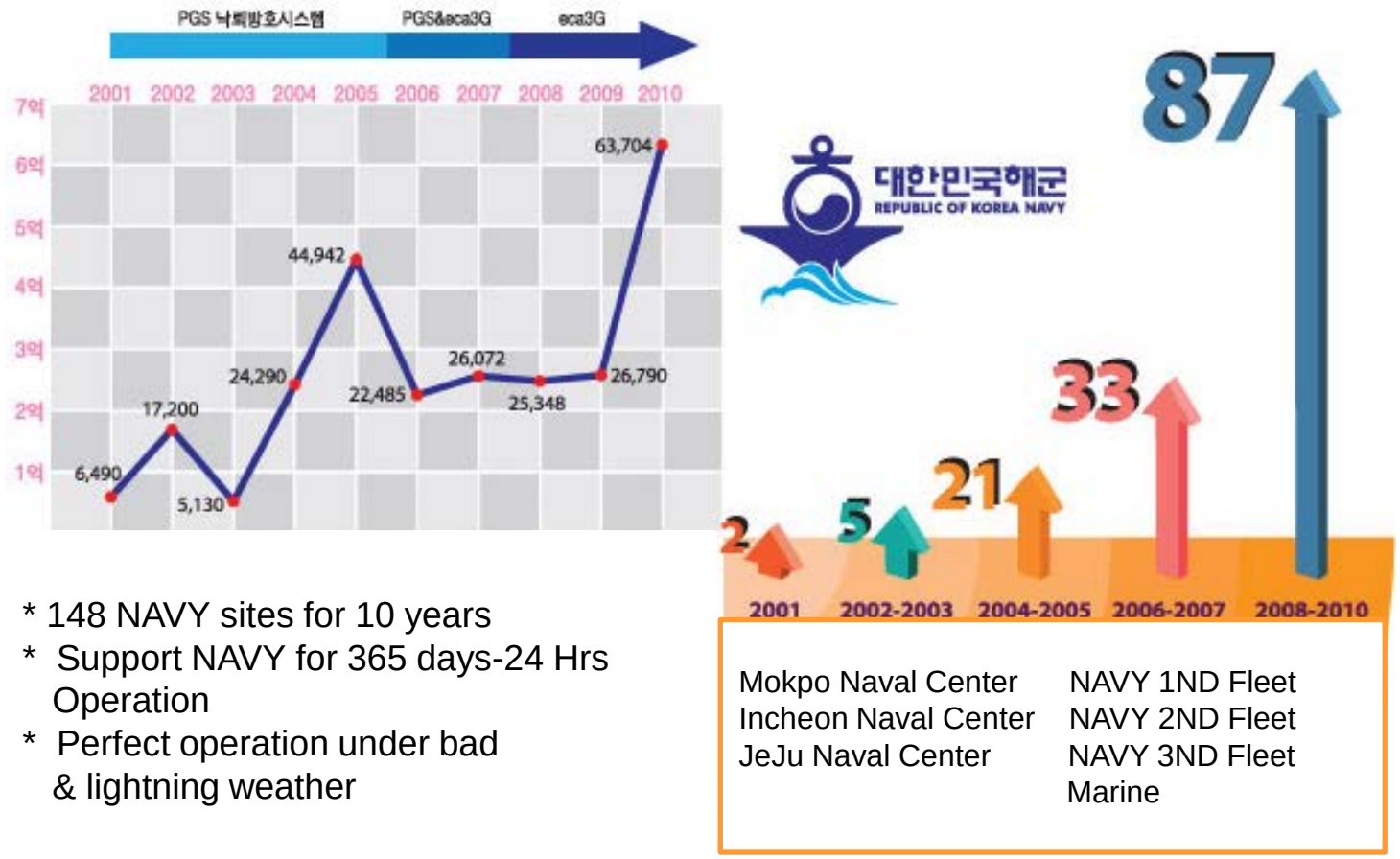
Machine Room

Air-conditioning System

Center CCTV

[NAVY 2 ND Fleet – Inspection]

ROK NAVY – 148 Sites for 10 years
Technical Standard of Navy lightning protection = PGS & eac3G

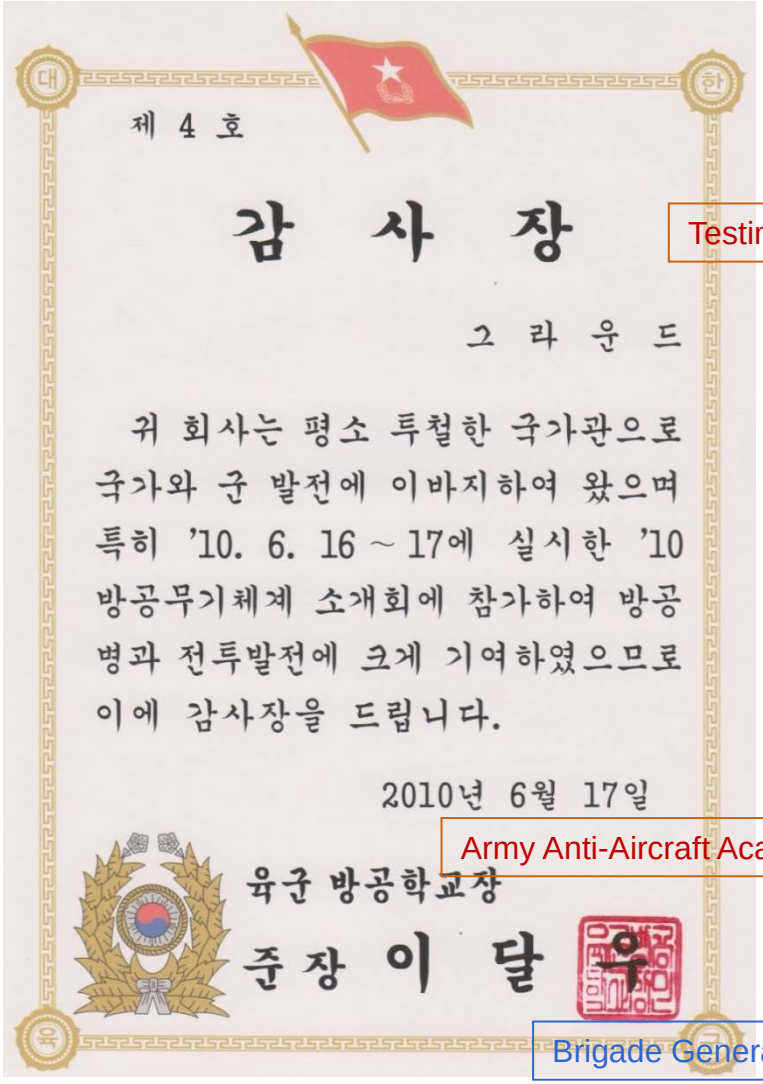


* 148 NAVY sites for 10 years
* Support NAVY for 365 days-24 Hrs Operation
* Perfect operation under bad & lightning weather

Mokpo Naval Center	NAVY 1ND Fleet
Incheon Naval Center	NAVY 2ND Fleet
JeJu Naval Center	NAVY 3ND Fleet
	Marine

ROK ARMY Lightning Protection

Anti-aircraft Artillery - eca3G



제 4 호

감 사 장

Testimonial Letter

그 라 운 드

귀 회사는 평소 투철한 국가관으로 국가와 군 발전에 이바지하여 왔으며 특히 '10. 6. 16 ~ 17에 실시한 '10 방공무기체계 소개회에 참가하여 방공병과 전투발전에 크게 기여하였으므로 이에 감사장을 드립니다.

2010년 6월 17일

Army Anti-Aircraft Academy Chief

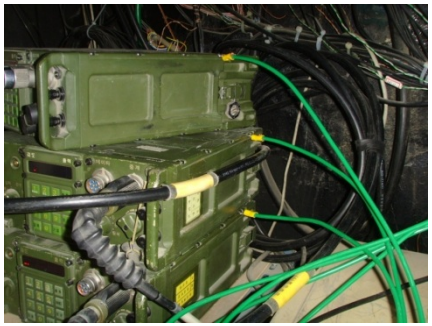
육군 방공학교장

준장 이 달 우

Brigade General Lee,D.W

[○○○ Radar Base]

UPS with eca3G



eca3G in Center

Communication system bonding

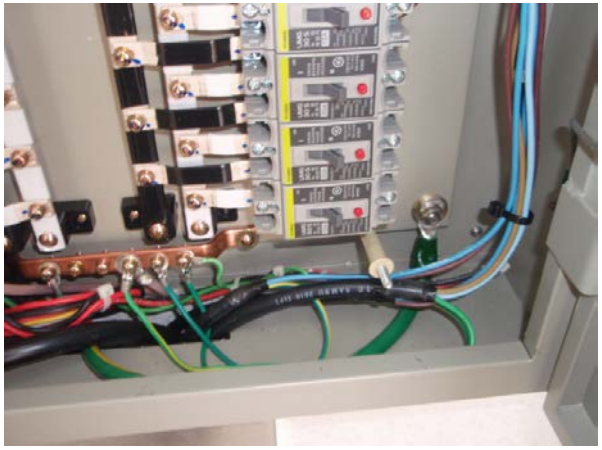
3 Army Corps Communication Vehicle

RF Test Vehicle

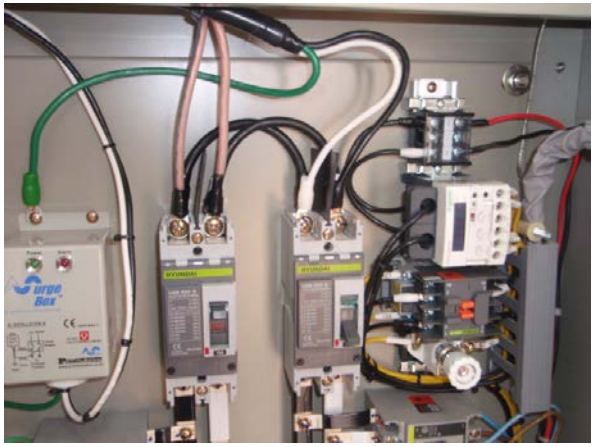
Communication Support Troop - CCTV system protection

[Radar Base sites - eca3G installation]

[Yang-Yang Airport - <eca3G> installation]



Grounding bar at Southern airway shelter



Power connection to <eca3G>

<eca3G> and System rack

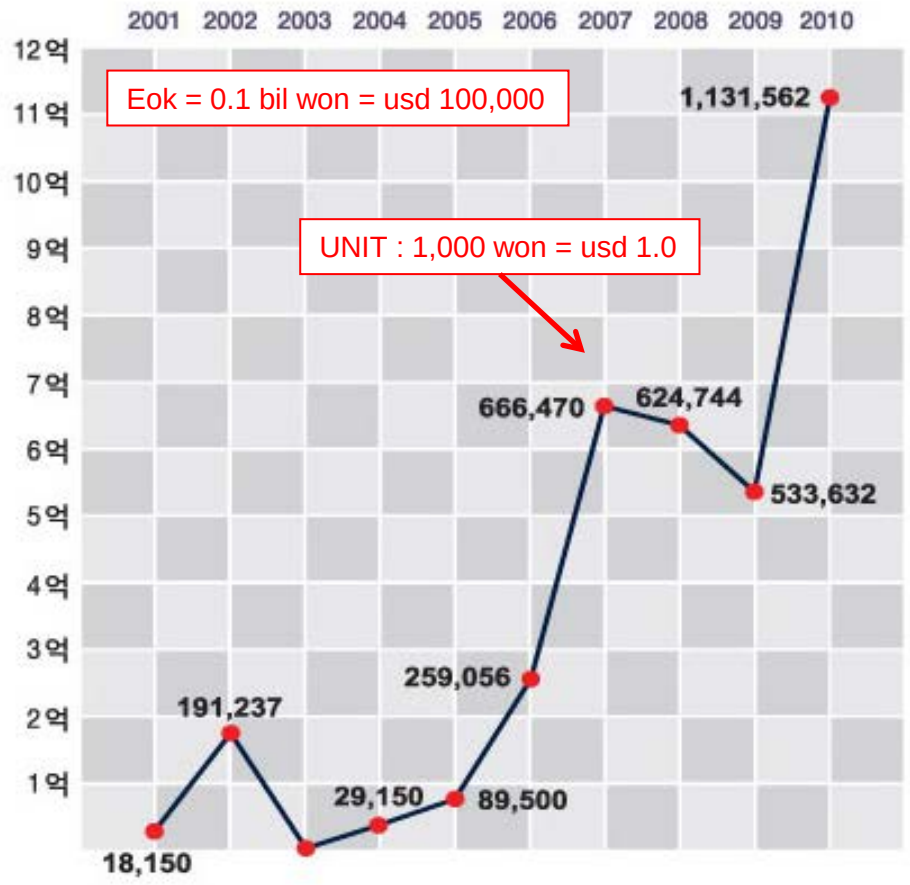
<eca3G> & ON-365 system connection

Integrated Lightning Surge Protection with ecaBG for

- Drinking Water Treatment Plant
- Sewage Treatment Plant

(165 sites nationwide)

Water Treatment Plant Lightning protection : 165 sites



· Seoul Sewage Plant
· Incheon Susan City Water Plant
· CHunCheon City Water Plant
· ChangWon City Water Plant
· DawSan County Water Plant
· DeokNam Water Plant
· MilYang County Water Plant
· BukMyeon Water Plant
· KwangYang city Water Plant
· BuAn Dam Office
· Kuri City Sewage Plant

* 165 sites for 10 years
* Support free from lightning surge
* Perfect operation under surge prone environment

Perfect Lightning Surge Protection for **KBS DTVR Unmanned Station -Digital TV Relay Station-**

KBS : National Broadcasting TV & Radio

CRMO (Central Radio Management Office)

KRTNet Corp –GwanAk Mt, 2-4-6 Sharing Base Station

KBS eca3G Sites : Digital TV Relay station

Year	Site
2006	KBS WonHyo, BulMo, MoAk Mt
2007	KBS HamBaek, GamAk, PalGong Mt
2008	KBS Heuksung, IlWol Mt
2009	KBS ChungJu(Jecheon), KBS YongMun Mt
2010	KBS YeongAm Hwansung Mt, GangJin Oknyeo Mt, KBS ChunCheon(HongCheon) Mudeungsan.
2011 Mar	KBS ChunCheon (YangGu,CheolWon, InJe, DaeMo Mt) KBS DoGye DTVR KBS GwangJu(YeongGwang, GunNam) KBS MokPo(JonDo, GunDong) KBS SunCheon(BeolGyo, DoHwa) KBS UlSan(Munsu Mt, YeonHwa Mt) KBS Gimcheon DTVR
	Total 27 Sites

Year	Site
2011. APR	KBS KimCheon, ChunCheon2
2011. May	KBS GwangJu
2011. Aug	KBS Mudeungsan
2011. Sept	KBS AnEui, JiGok, EonYang, YoungDeok, Guryongpo, Doeumsan, Baekryunsan,
2011. Oct	KBS Seosang, Macheon, Yaro, Punggak, Moseo KBS BulGwang, GwangMyung, Ansan, JinJeob, Hwado KBS Ulsan (Munsusan, Yeonhwasan)
2011 Nov	KBS ChungJu KBS ChunCheon KBS JinJu (Boriam) KBS GwanJu- 8 sites (Beonpseong, Bukee. BukIL, Yongsan, Youngcheon, Seongwang, Godal)
	plan to install 300+ sites

KBS Technical Seminar / Sept 15. 2009

Lecturing on the right Grounding & Surge protection to
KBS Technical department by CTO of Ground Co., Ltd

<eca3G> has been installed all the new
KBS DTVR Stations (overall 300 over sites, soon)

[KBS ChungJu Office –JeCheon DTVR Station . (2009)]

<eca3G - LM>
Installation

<eca3G LP>
Installation

Main Gate

System bonding

Rack, Transmission line bonding

Climbing to Station

[KBS UlSan Office : YeonHwa DTVR Station (2011. Oct)]

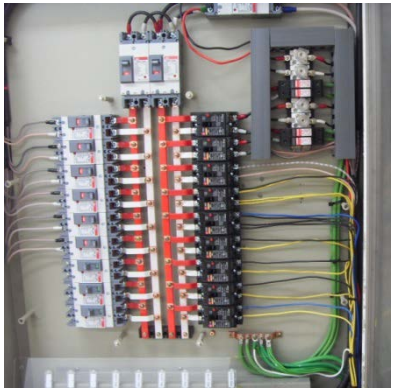
Relay station

< eca3G >
Installation

Relay station Gate

MGB Bonding

< eca3G > Health
Check



< eca3G > Cabling
to D.B

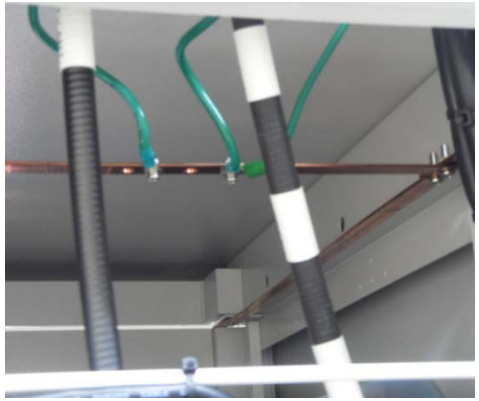
[KBS ChunCheon Office : HongCheon DTVR Station]

Relay station Tower

Transmission system Rack

Rack bonding

Equip & Rack bonding



Rack bonding

< eca3G > Installation

[KBS ChunCheon Office : YangGu DTVR Station-Mar.2011]

< eca3G > Installation

Sign Board

Main Ground bonding

Equi-potential bonding

Aerial cable bonding

Fence bonding

[KBS ChunCheon Office : InJe DTVR Station - Mar.2011]

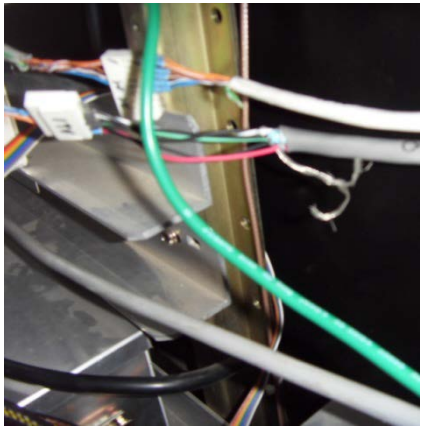
Relay station Tower

< eca3G > Installation

MGB Bonding

Aerial cable bonding

Equipment, Rack bonding



TV monitor shield cable bonding

[KBS ANSAN DTVR Station – (2011. Oct)]

Relay station

DTVR systems

Improve Bonding

< eca3G > installed

N-G potential before installation

N-G potential after installation

[KBS GwangMyung DTVR Station – (2011. Oct)]

Relay station

Sign Board

DTVR systems

< eca3G >
installed

< eca3G >
Cabling

Improve Bonding

N-G potential
before/after

[KBS BulGwang DTVR Station – (2011. Oct)]

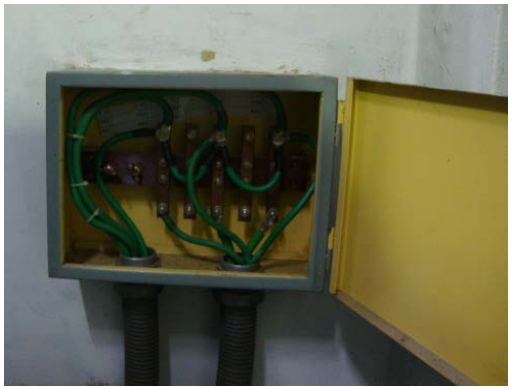
Relay station

DTVR systems

DTVR systems

< eca3G > installed

< eca3G > Cabling



Improve MGB Bonding

[KBS JinJu (Boriam) DTVR Station – (2011. Nov)]

Relay station

Sign Board

DTVR systems

< eca3G > installed

< eca3G > Cabling

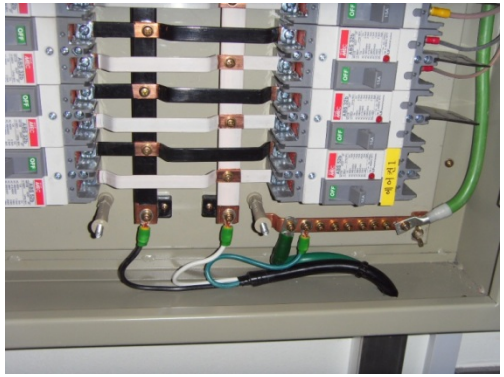
Improve Rack
Bonding

[KBS KimCheon DTVR Station – (2011, Apr)]

Relay station

< eca3G > installed

Cable Tray Bonding



< eca3G > Cabling to D.B

Improve Bonding

N-G potential - after

[GeoMunDo LIGHT HOUSE – (2010, Apr)]

Light House

< eca3G > installed

< eca3G > Cabling

< eca3G > Cabling

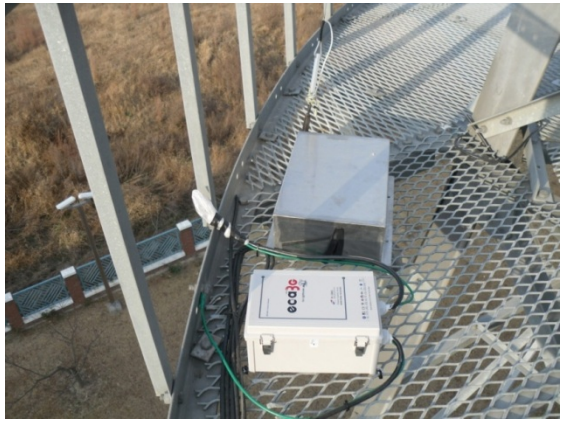
N-G potential - after

[CRMO (Central Radio Management Office) – JeonJu Office]

Site in JeonJu city , 2010 Nov-19

< eca3G > Installation

On the Tower



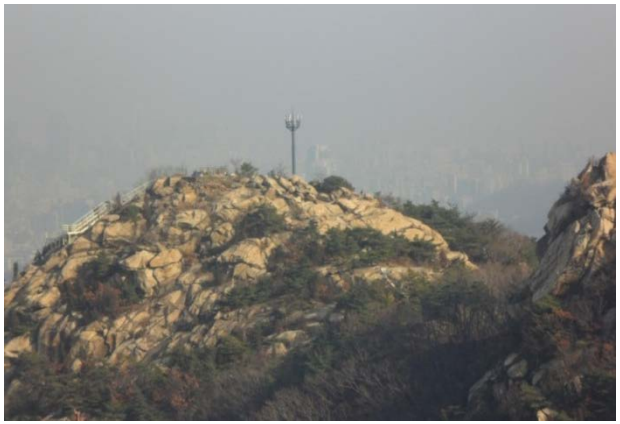
< eca3G > Installation

[KRTNet Corp –GwanAk Mt, 2-4-6 Sharing Base Station]

Site on the Mountain

< eca3G > Installation

Equi-potential Bonding



<GwanAk Mt Base Station> for sharing

Integrated Surge Protection with eca3G for **Korea Fire Fighting Agency**

(National Emergency Management Agency)

KyungBuk Province Fire Service Head Quarters

GangWon Province Fire Service Head Quarters

Major facilities of BOMBA which have surge damages

- Command & Control Center of C 4 i system
- Wired-Wireless Communication System
- CCTV Surveillance System
- Unmanned Forest Fire Monitoring System
- Broadcasting, paging, electronic equipment
- Communication Relay Station on the highland

Key Performances for BOMBA

National Emergency Management Agency, Korea (NEMA)

1."KyungBuk Province Fire HQ" C 4 I - Command & Control Center	implemented on March 2012
2. "KyungBuk Province Fire HQ" 10 Unmanned Relay Stations at Mountains	implemented on March 2012
3. "KyungBuk Province Fire HQ" Bohyun Mt. Relay Station	implemented on March 2011
4."GangWon Province Fire HQ" 70 Wireless Communication Stations	implemented on Dec. 2007
5. Unmanned Forest Fire Monitoring System	implemented on 2008, 2009
"KyungBuk Fire HQ" Tender Notice on Feb. 2012 ➡ < eca3G> become standard of tender specification	

4."GangWon Fire HQ" - 70 Wireless Communication Stations Digital Grounding System installation
for Fire fighting Wireless communication system

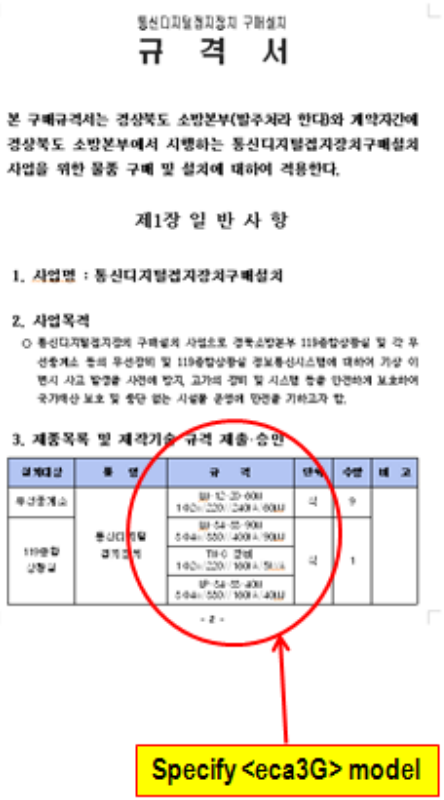
a) ChunCheon Fire Station – 6 sites
b) WonJoo Fire Station – 7 sites
c) GangReung Fire Station – 8 sites
d) DongHae Fire Station – 1 site
e) SokCho Fire Station – 9 sites
f) SamCheok Fire Station – 17 sites
g) HongCheon Fire Station – 7 sites
h) YeongWol Fire Station – 9 sites
i) JeongSeon Fire Station – 4 sites
j) CheolWon Fire Station – 2 sites / Total 70 sites

KyungBuk Fire HQ, Tender Notice on Feb 2012 / Purchase of Digital Grounding Device

Tender Notice : Purchase of Digital grounding device for communication

Purchase Specification

Product Specification



[KyungBuk Fire H.Q, C 4 I Center]

C 4 i Center

<eca3G> installation

Bonding improvement

Grounding Bonding improvement

Grounding Bonding improvement

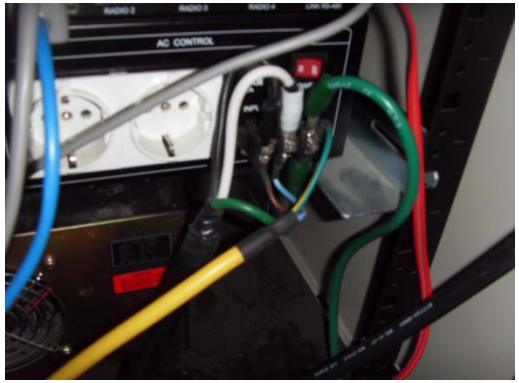
MGB installation

[MangHyang Mt. Relay Station – UlReung Fire Station]

Grounding improvement

Rack Ground Bar installation

<eca3G-LM>



<eca3G-LM>
Cabling

<eca3G-LM>
Installation

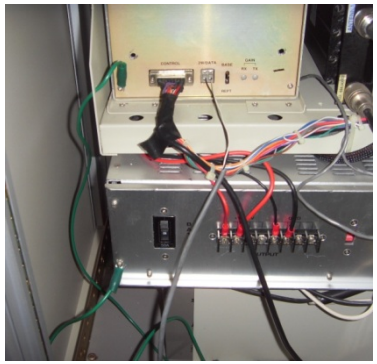
[YuHak Mt. Relay Station – ChilGok Fire Station]

Solar power panel

Bonding improvement

<eca3G-LM> Installation

Rack Ground Bar installation



Bonding improvement

Warning signboard for station

[BoHyun Mt. Relay Station – YoungCheon Fire Station]

Rack Ground Bar
installation

VHF Equipment Bonding
improvement

<eca3G-LM>
Installation

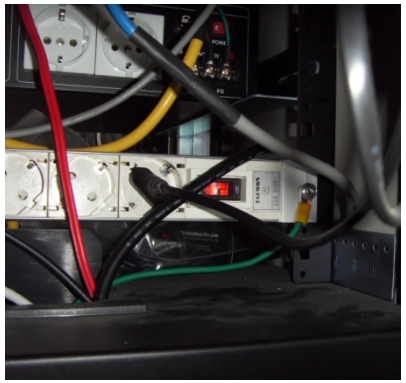
VHF Equipment Bonding
improvement

Equi-potential
Bonding

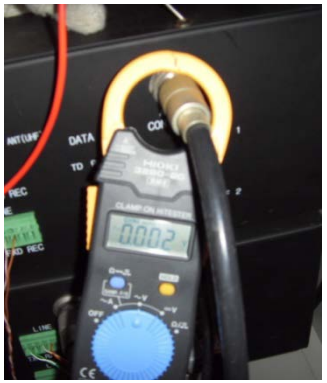
<eca3G-TNC>
Installation

[EuiSeong Remote system – YoungCheon Fire Station]

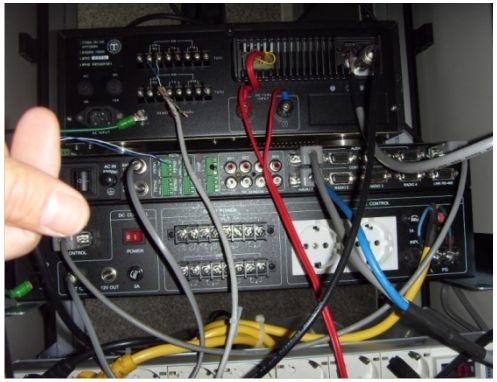
Bonding improvement



UHF equipment bonding improvement



Repeater Rack equi-potential



UHF equipment bonding improvement

Auto fire extinguisher bonding

Unmanned Relay Station

[YangGu Safety Center]

<eca3G-LM> Installation

Comm Protector installation

[HaeAn Post]

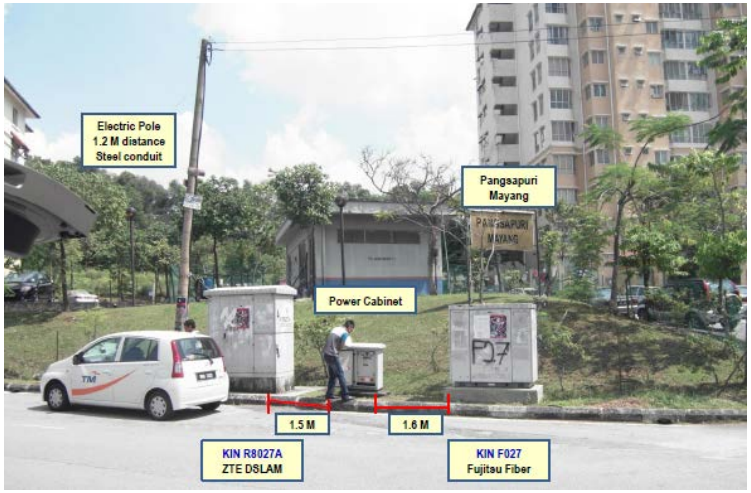
<eca3G-LM> Installation

Comm Protector installation

Performances in Malaysia

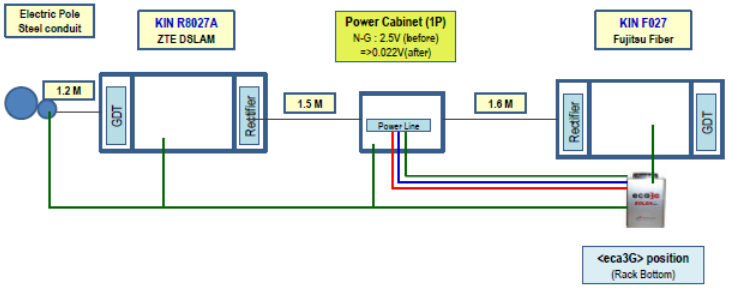
for **Telekom Malaysia (No1 Telco), Royal Malaysia Police , ATM, Toll Gate**

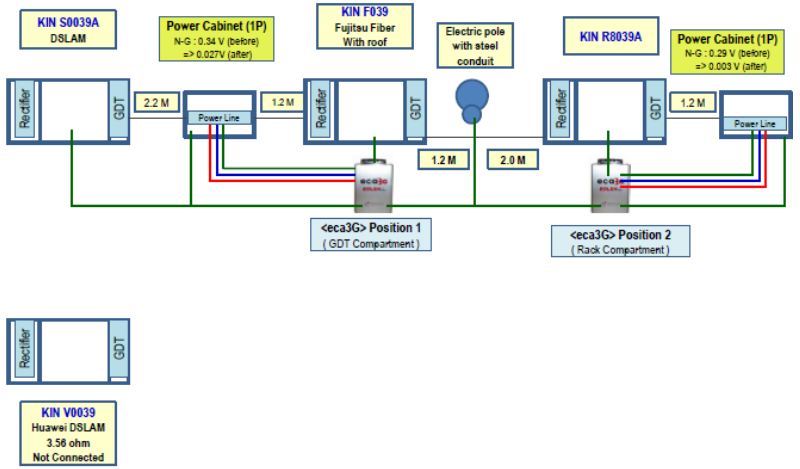
[Telekom Malaysia : Multi-Purpose Outdoor repeater Cabinet]



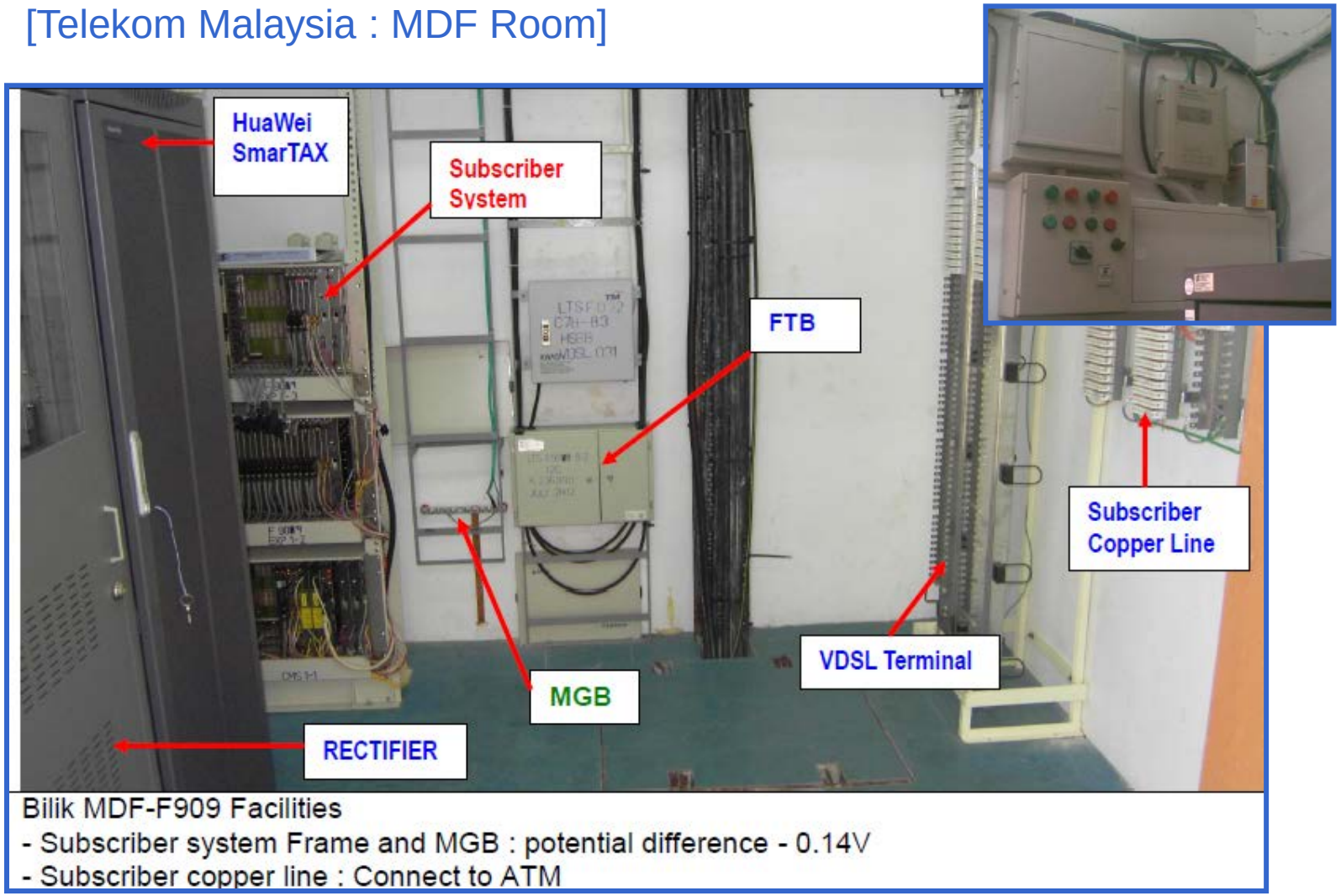
2. KIN F027, KIN R8027A : <eca3G> installation -1 unit

5. KIN F039, S0039A (Power Cabinet 1) &
KIN R8039A (Power Cabinet 2) : <eca3G> Installation – 2 units





[Telekom Malaysia : MDF Room]



Bilik MDF-F909 Facilities
- Subscriber system Frame and MGB : potential difference - 0.14V
- Subscriber copper line : Connect to ATM

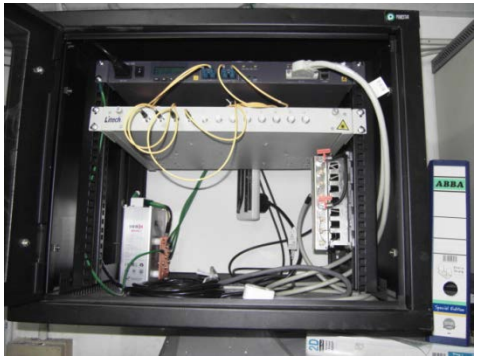
[ATM at Petrol Station]

Completions of Installation

[Police Station Setapak : <eca3G> Installation / Apr 10 (Tue),2012.]

PRS Cabinet without Grounding

Grounding improvement for equipment



<eca3G> for PRS Cabinet grounding

Bonding improvement for PABX

Bonding improvement for PABX

Bonding improvement for PRS

[Police Station Sri Permaisuri : <eca3G> Installation]

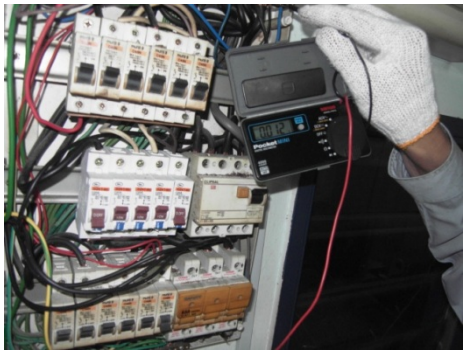
Grounding connection to PRS cabinet to <eca3G>

Grounding cabling : bonding improvement

<eca3G> preparation

<eca3G> at DB

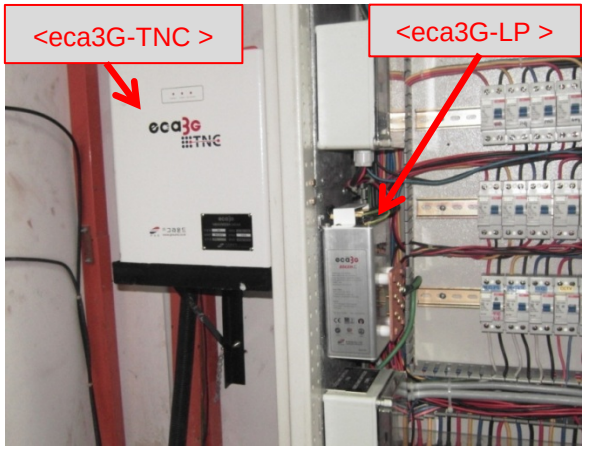
<eca3G> at beside of DB



N-G after <eca3G> installation at DB : 0.012 V

[Malaysia North-South Highway Corporation - < eca3G > installation]

<eca3G-LM > installation :
parallel connection at UPS



<eca3G- TNC > and
<eca3G-LP> connection

Toll gate Booth

<eca3G-LP > installation :
parallel connection at UPS

Performances in Thailand

for **GISTDA Satellite Station, Ammunition Depot Surveillance System, Post Engineering BD Quartermaster Surveillance System**

[Army Ammunition Depot : <eca3G-LM > Installation]

<eca3G > preparation

<eca3G – LM > preparation

<eca3G-LM > positioning to protect three UPS and Monitoring systems

Rear part of <eca3G-LM >

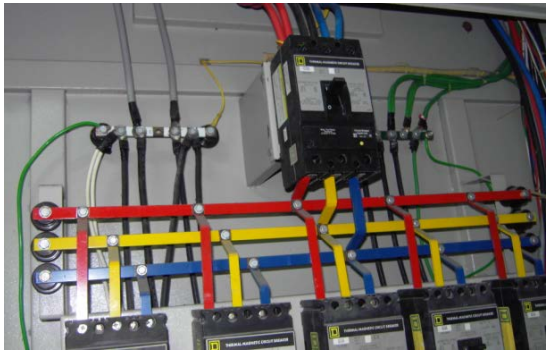
<eca3G-LM > & Three UPS

< eca3G-LM> installation

[Post Engineering BD : <eca3G> Installation]

Main DB (3 phase, 4 wire)

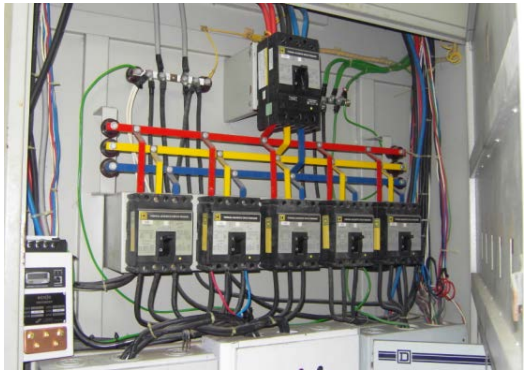
<eca3G> preparation



<eca3G> cabling to Neutral Terminal & Ground Terminal

<eca3G > positioning in DB

<eca3G> cabling to 3 live lines



<eca3G> installation

eca3G

<eca3G> for Mobile Vehicle

- Mobile Communication Vehicle
- Mobile RF Test Vehicle
- Mobile Power Generator DB
- Mobile Satellite Communication Vehicle
- Mobile Radar Control Shelter

[Army Corps RF Test Vehicle(2007)]


[Army Corps RF Test Vehicle(2008)]


[○○ Army Corps Communication Vehicle]

[Army Corps Mobile Communication Vehicle(2008)]




<eca3G-LM> model for Generator DB/<eca3G-CM>model for Communication Vehicle

[Mobile Tactical ○○○○ Vehicles with <eca3G>]

TPS-830 Low-Altitude Surveillance Radar

enables early detection of moving targets infiltrating in low altitudes and transmits target specifications including the azimuth, speed, proximity, sweepback angle and distance - to air defense weapons via cable or radio to allow early response. * Won National Defense Science R&D Award (Nov 1997)

http://www.lignex1.com:8001/en_US/product/product_detail.jsp?pid=19&scode1=&scode2=&scode3=&skey

Next-Generation Local Air Defense Radar

is 3D radar developed to detect the altitude of flight vehicles to boost the capability to respond to North Korea's low-altitude aerial attack and penetration threats, which is a significant improvement compared with the existing 2D radar detecting only the distance and direction of aircraft.

http://www.lignex1.com:8001/en_US/product/product_detail.jsp?pid=18&&scode1=&scode2=&scode3=&skey

[Mobile Tactical ○○○○ Vehicles with <eca3G>]

Firing Artillery Locating Radar System

is a stand alone C-band medium-range weapon-locating system that detects and locates enemy fire. It utilises a passive phased-array antenna technology for optimised battlefield performance. The technology provides the perfect balance between mobility, range, accuracy, ECCM (Electronic counter-countermeasures), operational availability and operational cost.

http://www.army-guide.com/eng/article/article.php?forumID=2090

Air force Command & Control vehicle for KM-SAM missile

< KM-SAM missile > is the Middle range Surface-to-Air missile developed for Korean Air Force, consist of 1 Multi-Functional Radar vehicle, 1 Command & Control vehicle and 8 missile launching vehicles

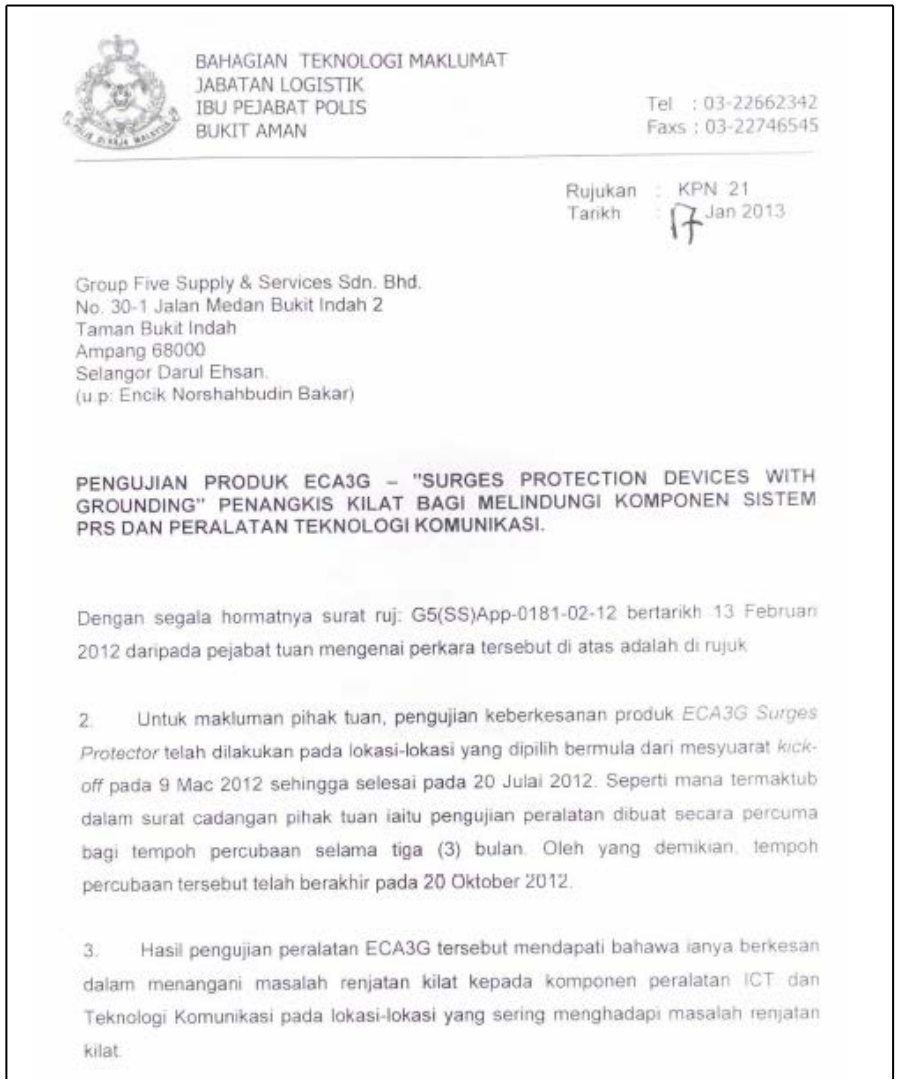
http://blog.naver.com/PostView.nhn?blogId=khhong1&logNo=70090793435

[<eca3G > in the mobile communication vehicle]

Lightning Rod and Vehicles

- Advertisement at news paper -

[Testimonial - Royal Malaysia Police]



BAHAGIAN TEKNOLOGI MAKLUMAT
JABATAN LOGISTIK
IBU PEJABAT POLIS
BUKIT AMAN

Tel : 03-22662342
Faxs : 03-22746545

Rujukan : KPN 21
Tarikh : 17 Jan 2013

Group Five Supply & Services Sdn. Bhd.
No. 30-1 Jalan Medan Bukit Indah 2
Taman Bukit Indah
Ampang 68000
Selangor Darul Ehsan.
(u.p: Encik Norshahbudin Bakar)

PENGUJIAN PRODUK ECA3G – "SURGES PROTECTION DEVICES WITH GROUNDING" PENANGKIS KILAT BAGI MELINDUNGI KOMPONEN SISTEM PRS DAN PERALATAN TEKNOLOGI KOMUNIKASI.

Dengan segala hormatnya surat ruj: G5(SS)App-0181-02-12 bertarikh 13 Februari 2012 daripada pejabat tuan mengenai perkara tersebut di atas adalah di rujuk.

2. Untuk makluman pihak tuan, pengujian keberkesanan produk *ECA3G Surges Protector* telah dilakukan pada lokasi-lokasi yang dipilih bermula dari mesyuarat *kick-off* pada 9 Mac 2012 sehingga selesai pada 20 Julai 2012. Seperti mana termaktub dalam surat cadangan pihak tuan iaitu pengujian peralatan dibuat secara percuma bagi tempoh percubaan selama tiga (3) bulan. Oleh yang demikian, tempoh percubaan tersebut telah berakhir pada 20 Oktober 2012.

3. Hasil pengujian peralatan ECA3G tersebut mendapati bahawa ianya berkesan dalam menangani masalah renjatan kilat kepada komponen peralatan ICT dan Teknologi Komunikasi pada lokasi-lokasi yang sering menghadapi masalah renjatan kilat.

4. Memandangkan tempoh percubaan tiga (3) bulan yang telah berakhir pada 20 Oktober 2012, pihak kami memohon kerjasama pihak tuan untuk menanggalkan produk ECA3G tersebut melalui penglibatan bersama pihak PDRM dan juga pihak tuan. Untuk makluman pihak tuan, laporan pengujian ECA3G yang diberikan kepada pihak kami akan dibincangkan ke peringkat atasan PDRM untuk tindakan selanjutnya.

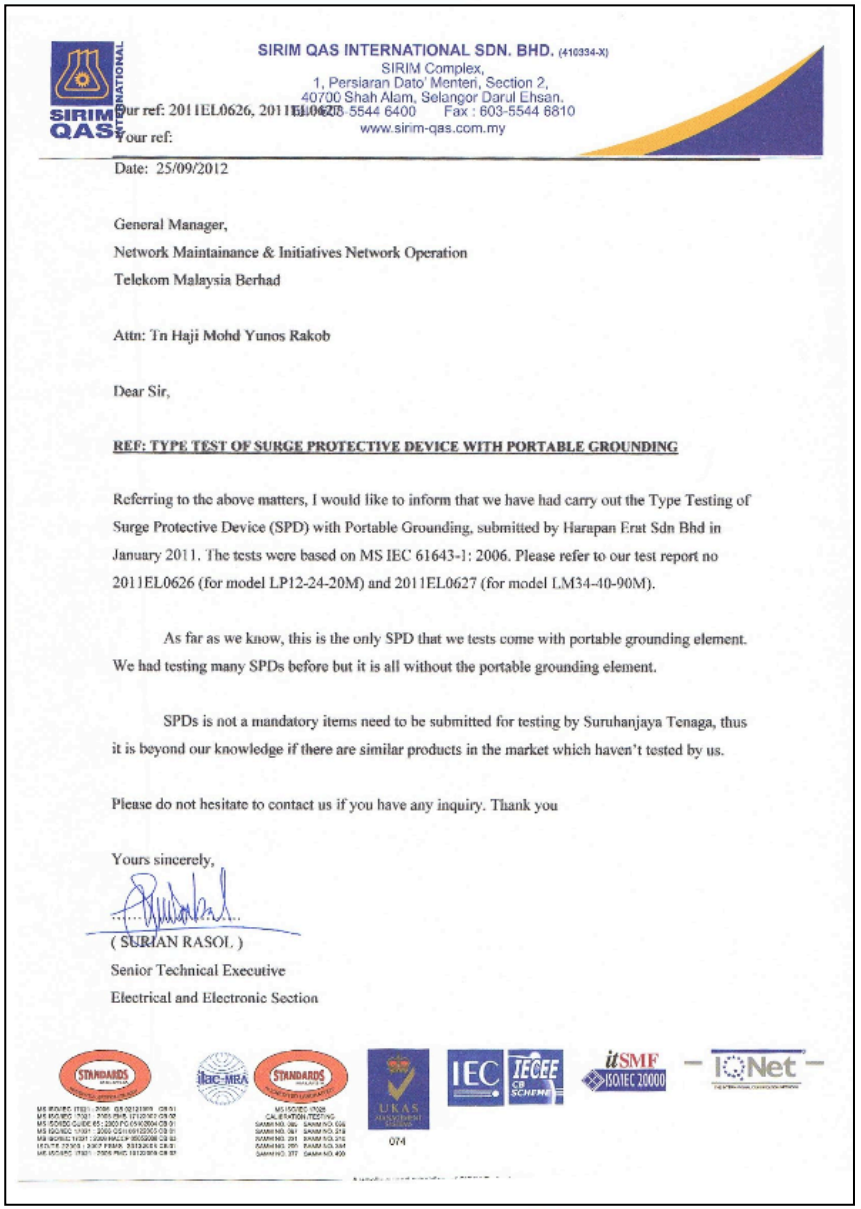
5. Pihak kami amat berbesar hati dengan kesediaan dan komitmen pihak tuan dalam memberi peluang bagi pengujiaan peralatan tersebut. Semoga pengujian yang telah dijalankan ini menjadi titik permulaan ke arah mempertingkatkan keupayaan pasukan PDRM ke tahap yang optimum.

Sekian, terima kasih

.....
(MAT KASIM BIN KARIM) SAC
Ketua Penolong Pengarah Jabatan Logistik
Bahagian Teknologi Maklumat
Jabatan Logistik, Bukit Aman

s.k. : Pengarah Jabatan Logistik
Timbalan Pengarah 1 Jabatan Logistik
Ketua Unit Pengurusan Operasi, Bahagian Teknologi Maklumat
Fail

[Testimonial – SIRIM]



SIRIM QAS INTERNATIONAL SDN. BHD. (410334-X)
SIRIM Complex,
1, Persiaran Dato' Menteri, Section 2,
40700 Shah Alam, Selangor Darul Ehsan.
Tel : 603-5544 6400 Fax : 603-5544 6810
www.sirim-qas.com.my

Our ref: 2011EL0626, 2011EL0627
Your ref:

Date: 25/09/2012

General Manager,
Network Maintainance & Initiatives Network Operation
Telekom Malaysia Berhad

Attn: Tn Haji Mohd Yunos Rakob

Dear Sir,

REF: TYPE TEST OF SURGE PROTECTIVE DEVICE WITH PORTABLE GROUNDING

Referring to the above matters, I would like to inform that we have had carry out the Type Testing of Surge Protective Device (SPD) with Portable Grounding, submitted by Harapan Erat Sdn Bhd in January 2011. The tests were based on MS IEC 61643-1: 2006. Please refer to our test report no 2011EL0626 (for model LP12-24-20M) and 2011EL0627 (for model LM34-40-90M).

As far as we know, this is the only SPD that we tests come with portable grounding element. We had testing many SPDs before but it is all without the portable grounding element.

SPDs is not a mandatory items need to be submitted for testing by Suruhanjaya Tenaga, thus it is beyond our knowledge if there are similar products in the market which haven't tested by us.

Please do not hesitate to contact us if you have any inquiry. Thank you

Yours sincerely,

(SURIAN RASOL)
Senior Technical Executive
Electrical and Electronic Section

SIRIM QAS INTERNATIONAL
SIRIM QAS International Sdn.Bhd. (Company No.: 410334-X)
No.1, Persiaran Dato' Menteri, P.O.BOX 7035, Section 2,
40911 Shah Alam, Selangor Darul Ehsan, Malaysia
Tel. no: 03-55446253 / 55446251 Fax. no: 03-55446272

TEST REPORT

REPORT NO.: 2011EL0627	PAGE : 1 OF 77

Applicant : Harapan Erat Sdn. Bhd.,
D10-10-1, Blok D10,
Pusat Perdagangan Dana 1,
Jalan PJU 1A/U6, PJU 1A,
47301 Petaling Jaya,
Selangor, Malaysia.

Manufacturer : Ground Co., Ltd,
209 SunTech City, 307-2 Sangdaewon-dong,
Jungwon-gu, Seongnam-si, Kyenggi-do,
South Korea.

Product : SURGE PROTECTIVE DEVICES WITH GROUNDING FOR LOW VOLTAGE SYSTEMS

Reference Standard / Method of test : MS IEC 61643-1: 2006

Description of sample: Brand Name : ECA3G
Model / Type : LM-34-40-90M (Three Phase)
Rating : Imax : 65 kA
In : 20 kA
Uc : 275 V (L – N); 255 V (N – G)
Classification : Class II (see page 4)

Date received : 10-Jan-2011
Job No./Ref.No. : J20115020028
Issued date : 18 MAY 2011

Approved Signatories

(SURIAN RASOL)
Senior Technical Executive

(MOHD ISMAIL)
Testing Specialist,
Electrical & Electronic Section
Testing Services Department

SIRIM QAS INTERNATIONAL
SIRIM QAS International Sdn.Bhd. (Company No.: 410334-X)
No.1, Persiaran Dato' Menteri, P.O.BOX 7035, Section 2,
40911 Shah Alam, Selangor Darul Ehsan, Malaysia
Tel. no: 03-55446253 / 55446251 Fax. no: 03-55446272

TEST REPORT

REPORT NO.: 2011EL0626	PAGE : 1 OF 77

Applicant : Harapan Erat Sdn. Bhd.,
D10-10-1, Blok D10,
Pusat Perdagangan Dana 1,
Jalan PJU 1A/U6, PJU 1A,
47301 Petaling Jaya,
Selangor, Malaysia.

Manufacturer : Ground Co., Ltd,
209 SunTech City, 307-2 Sangdaewon-dong,
Jungwon-gu, Seongnam-si, Kyenggi-do,
South Korea.

Product : SURGE PROTECTIVE DEVICES WITH GROUNDING FOR LOW VOLTAGE SYSTEMS

Reference Standard / Method of test : MS IEC 61643-1: 2006

Description of sample: Brand Name : ECA3G
Model / Type : LP-12-24-20M (Single Phase)
Rating : Imax : 40 kA
In : 10 kA
Uc : 275 V (L – N); 255 V (N – G)
Classification : Class II (see page 4)

Date received : 10-Jan-2011
Job No./Ref.No. : J20115020028
Issued date : 18 MAY 2011

Approved Signatories

(SURIAN RASOL)
Senior Technical Executive

(MOHD ISMAIL)
Testing Specialist,
Electrical & Electronic Section
Testing Services Department

[Testimonial – UTM university]

UTM Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MALAYSIA

INSTITUTE OF HIGH VOLTAGE AND HIGH CURRENT(IVAT)

TEST REPORT

CLASSIFICATION	VALIDATION TEST
APPARATUS	SURGE PROTECTION DEVICE WITH GROUNDING ELEMENT
DESIGNATION	ECA3G LP
RATINGS	Imax : 40kA, Iin : 10kA, Uc : 275 V (L-N); 255 V(N-G)
APPLICANT	Harapan Erat SdnBhd (874234-P) No. 14-1, Jalan Opera B U2/B, TTDI Jaya, 40150 Shah Alam Selangor
MANUFACTURER	Ground Co. Ltd #209 Suntech City2, 307-2 Sangdaewon-dong, Jungwon-gu Sungnam-si, Gyunggi-do, Korea
DATE OF TEST	14 June 2012
DATE OF ISSUE	: 29 June 2012
TESTED BY	: Prof. Dr. Hussein Bin Ahmad

PROF. DR. HUSSEIN BIN AHMAD
Pengarah
Institut Voltan Dan Arus Tinggi
Fakulti Kejuruteraan Elektrik
Universiti Teknologi Malaysia
81310 UTM Skudai,
Johor Darul Takzim.

The tests have been carried out in accordance with IEC 60060-2 High Voltage Tests Techniques.

The test results are presented based on test records to determine the performance of the tested apparatus. The oscillograms are attached hereto.

This document shall not be reproduced except with a written approval from the Director of IVAT.

Methods used in this test reports are in compliance with the scopes accredited by SAMM to the Institute of High Voltage and High Current Accreditation Scheme SAMM 285 in impulse voltage measurement.

Based on the observation of the above tests, the portable grounding device when was used instead of the naturally installed grounding system, the trends in the LAT attracting capability was the same when tests using the natural grounding system.

The unnatural grounding has the same function with the natural grounding, which is grounding to the earth. Based on the observation of competitive test with different kind of grounding that was connected to the conventional LAT and modified LAT, it was found that the unnatural grounding can play a role as the grounding system because it can absorb the impulse strikes.

CONCLUSION AND SUGGESTION

5.0 Conclusion

It is also learnt that the ECA 3G is a grounding elements that can absorb the lightning impulse current. It can function as a natural grounding.

Associate Professor Dr. Zolkafle b. Buntat
Deputy Director (R&D)
Institute of High Voltage and High Current
Faculty of Electrical Engineering
Universiti Teknologi Malaysia
81310 UTM Skudai
Johor Darul Takzim

[Testimonial – Korea Navy]

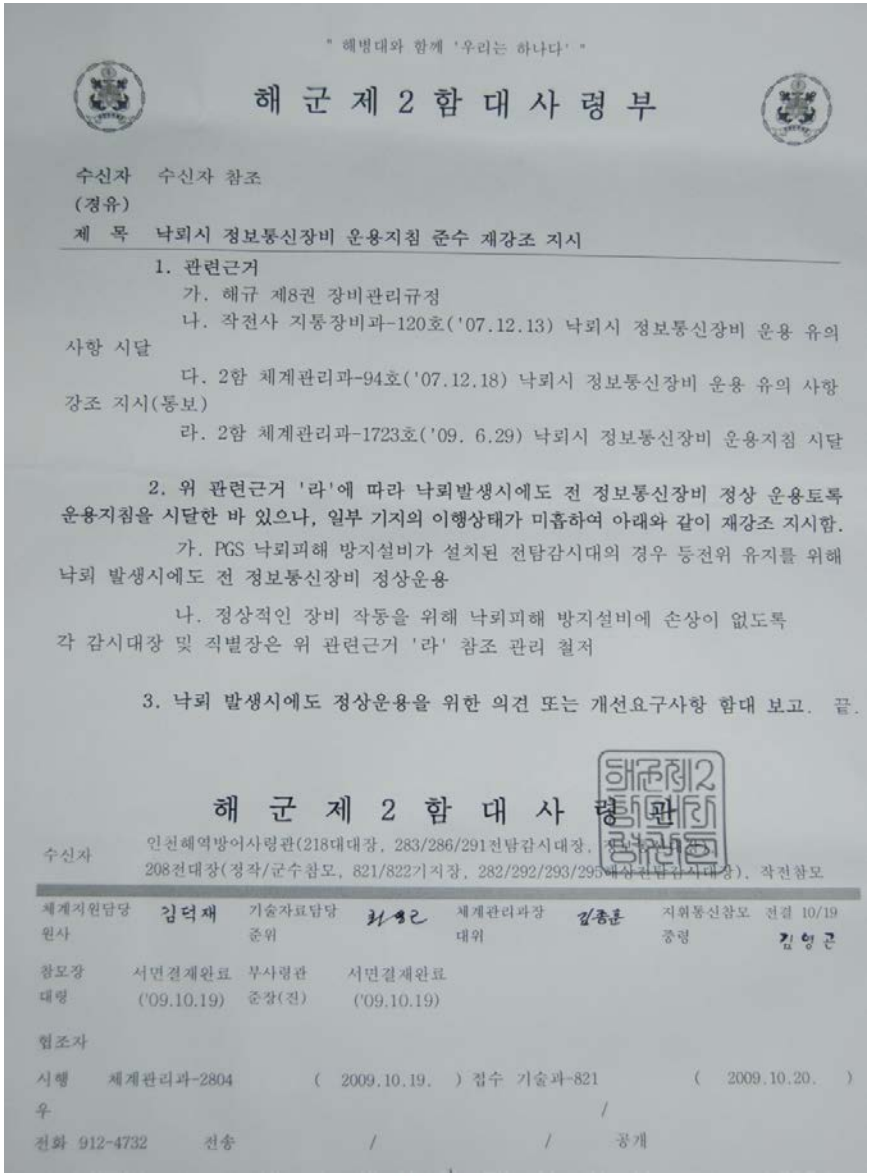
대한민국해군
REPUBLIC OF KOREA NAVY

NAVY 2 ND Fleet Commander

Instruction Letter

Re: Operation Guide for IT & Communication system under Lightning weather

- Should operate all the system equipped with Ground solution as normal even under heavy Lightning Weather without cut-off power



" 해병대와 함께 '우리는 하나다' "

해 군 제 2 함 대 사 령 부

수신자 수신자 참조
(경유)
제 목 낙뢰시 정보통신장비 운용지침 준수 재강조 지시

1. 관련근거
가. 해규 제8권 장비관리규정
나. 작전사 지통장비과-120호('07.12.13) 낙뢰시 정보통신장비 운용 유의사항 시달
다. 2함 체계관리과-94호('07.12.18) 낙뢰시 정보통신장비 운용 유의 사항 강조 지시(통보)
라. 2함 체계관리과-1723호('09. 6.29) 낙뢰시 정보통신장비 운용지침 시달

2. 위 관련근거 '라'에 따라 낙뢰발생시에도 전 정보통신장비 정상 운용토록 운용지침을 시달한 바 있으나, 일부 기지의 이행상태가 미흡하여 아래와 같이 재강조 지시함.
가. PGS 낙뢰피해 방지설비가 설치된 전탐감시대의 경우 등전위 유지를 위해 낙뢰 발생시에도 전 정보통신장비 정상운용
나. 정상적인 장비 작동을 위해 낙뢰피해 방지설비에 손상이 없도록 각 감시대장 및 직별장은 위 관련근거 '라' 참조 관리 철저

3. 낙뢰 발생시에도 정상운용을 위한 의견 또는 개선요구사항 함대 보고. 끝.

해 군 제 2 함 대 사 령 관

수신자 인천해역방어사령관(218대대장, 283/286/291전탐감시대장, [illegible]
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체계지원담당 원사	김덕재	기술자료담당 준위	[illegible]	체계관리과장 대위	김종훈	지휘통신참모 중령	전결 10/19 김형근
참모장 대령	서면결재완료 ('09.10.19)	부사령관 준장(진)	서면결재완료 ('09.10.19)				

협조자

시행 체계관리과-2804 (2009.10.19.) 접수 기술과-821 (2009.10.20.)

우

전화 912-4732 전송 / / 공개

GROUND Since1999 그라운드
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ecaBG

Thank you.

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