



# (U//FOUO) AURORAGOLD

## Working Group

# (S//SI//REL) Shaping understanding of the global GSM/UMTS/LTE landscape

# SIGDEV Conference – 6 June 2012

This briefing is classified:  
TOP SECRET//SI//REL TO FVEY

Derived From: NSA/CSSM 1-52  
Dated: 20070108  
Declassify On: 20370501



# Agenda

(U)

- (U//FOUO) What is AURORAGOLD?
- (U) Why come to us?
- (U) Our value proposition...
  - (S//SI//REL) Primary source mobile network information
  - (S//SI//REL) First-hand insight into industry changes
- (U//FOUO) Targeting efforts
- (U) Notable successes
- (U) Future plans
- (U) Discussion!



# What is AURORAGOLD?



(U//FOUO)

(U) Team of analysts, developers, and wireless SMEs working on:

- (S//SI//REL) Database of Mobile Network Operators (MNOs), networks, and PWIDs from collected GSM/UMTS/LTE roaming documents (IR.21s)
- (S//SI//REL) Target development effort against MNOs, roaming hubs, and working groups
- (U) Fusion of open source, commercial data with SIGINT to answer wireless needs



(U)

# Why come to us?

- (S//SI//REL) Extensive, global IR.21 data vetted by SSG4 analysts:
  - **701 networks of estimated 985** (as of 15 May 2012)
  - First-hand SIGINT information direct from MNOs
- (S//SI//REL) Most comprehensive set of IR.21-related email selectors and keyword-based tasking:
  - **1201 actively managed email selectors** (as of 15 May 2012)
- (U//FOUO) Foundation for worldwide mobile wireless network trending and forecasting
  - Includes visibility into changing industry standards and practices



# How can we help you?



(U)

(S//SI//REL) Example: “AFRICOM IKD-OPS requires information concerning the SMS Gateway domains for: Libyana mobile (libyana.ly) and Al Madar Al Jadid (almadar.ly). We believe these are the only two mobile providers in Libya but if you have information to the contrary please let us know.”

3 March 2011





# We've done the research



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- (S//SI//REL) Quickly identified collected IR.21s
- (U//FOUO) Pushed information out to customer through product reporting

DOCN 000028528  
ZNY ZNY MMIVX  
ZKZK ZKZK RR SOL DE  
PDTG R 162037Z MAR 11  
FM FM DIRNSA  
CLAS T O P S E C R E T UMBRA US/UK/CAN/AUS/NZ EYES ONLY QQQQ  
XXMM XXMMENP01F0011075

SERI SERIAL: 3/00/506998-11

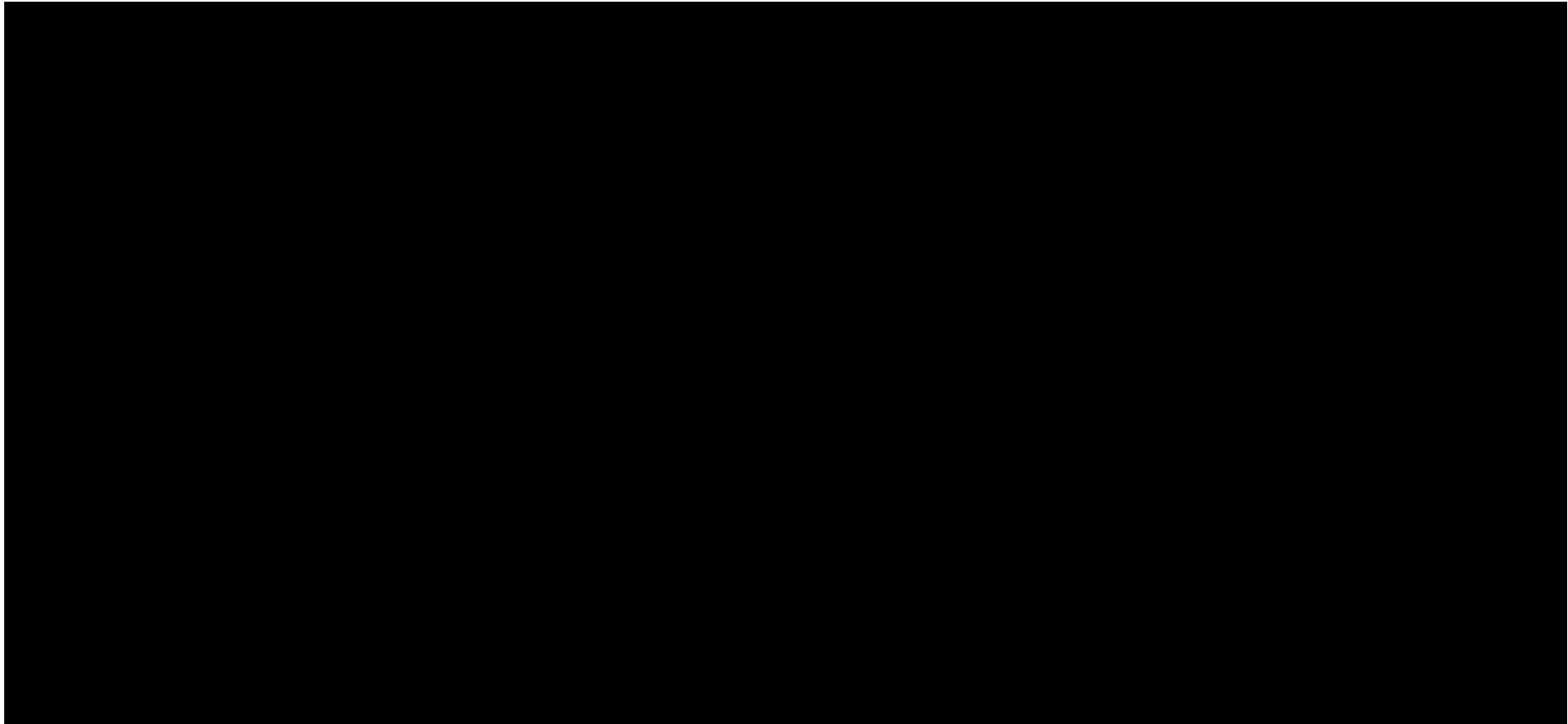
TAGS TAGS: LIC CCOM CLOG COEF CORG CPER CTEC CTPH LI

SUBJ SUBJ: Libya/Telecommunications: Two Libyan Mobile Phone Companies Provide Updated Network Information, June and December 2010  
(S//SI//REL TO USA, FVEY)



# SIGINT Value – Al Madar IR.21

(S//SI//REL)



Extracted from 3/00/506998-11



# SIGINT Value – Al Madar IR.21



(S//SI//REL)

Vendor Information	
BSS vendor(s) and SW/HW version:	Ericsson
HLR vendor(s) and SW/HW version:	Ericsson
MSC/VLR vendor(s) and SW/HW version:	Ericsson
SMSC vendor(s) and SW/HW version:	Alcatel-Lucent V 3.1
SGSN vendor(s) and SW/HW version:	Ericsson R7
GGSN vendor(s) and SW/HW version:	Ericsson R4
MMSC vendor(s) and SW/HW version:	Ericsson MMC 5.0
IN vendor(s) and SW/HW version:	Alcatel-Lucent

**SMSC Information**

**SMSC GT addresses<sup>9</sup>:** [REDACTED]

GPRS Information	
APN Operator Identifier	
WCDMA	List of APN
	APN
	Username
	Password
	ISP DNS IP address (primary)
	ISP DNS IP address (secondary)
WAP	APN
	Username
	Password
	WAP Gateway IP address
	WAP Server URL
	Port
MMS	APN
	Username
	Password
	WAP Gateway IP address for MMS
	Messaging Server URL
	Port
GTP version	SGSN
	GGSN
	BSS information (optional field)
Contact person(s) for GPRS (optional field)	

MMS Interworking Information	
	Domain name of MMSC
	IP address range for MMSC
	IP address(es) of incoming MTA
	IP address(es) of outgoing MTA
	Max. size of MMS allowed
	Delivery Report allowed?
	Read Report allowed?
Contact person(s) for IW MMS: (optional field)	
MMS IW Hub Provider(s) GT addresses:	
MMS IW Hub Provider(s) Name(s):	

Extracted from 3/00/506998-11



# IR.21s in AURORAGOLD



(S//SI//REL)

**1.8.3 ROAMING DATA BASE**

Operator name	AL MADAR AL JADID	
Technology	GSM 900 /1800	
Country (Abbreviated according to ISO 3166).	Libya LBY	

**ROUTING INFORMATION**

CCITT E.164 Number series:	Country Code (CC)	National Destination Code (NDC)
<i>MSISDN Number range(s):</i>	218	91
<i>Network nodes Global Title number range(s):</i>	218	91
E.212 Number series:	Mobile Country Code (MCC)	Mobile Network Code (MNC)
	606	01
E.214 Mobile Global Title: (MGT)	Country Code of MGT (CC)	Network Code of MGT (NC)
	218	91
Does Number Portability apply <sup>1</sup> ?		No

## International Roaming Coordinator:

Eng. [REDACTED]  
 IR Coordinator  
 T: [REDACTED]  
 Fax: [REDACTED]  
 Email: [REDACTED] @almadar.ly

Eng. [REDACTED]  
 IR Coordinator  
 T: [REDACTED]  
 Fax: [REDACTED]  
 Email: [REDACTED] @almadar.ly

Eng. [REDACTED]  
 IR Coordinator  
 T: [REDACTED]  
 Fax: [REDACTED]  
 Email: [REDACTED] @almadar.ly

Eng. [REDACTED]  
 IR Coordinator  
 T: [REDACTED]  
 Fax: [REDACTED]  
 Email: [REDACTED] @almadar.ly

Extracted from 3/00/506998-11



# We monitor the industry



(S//SI//REL)

- (S//SI//REL) Visibility into changing standards and practices for:
  - Roaming
  - Signaling
  - Billing
  - Interoperability
- GSM Association (GSMA), a Swiss association that drives the GSM/UMTS/LTE space



# Roaming Agreement EXchange (RAEX)

(S//SI//REL)

- (U) Next-generation roaming exchange process
- (U) Well-defined XML schemas instead of semi-structured data in multiple formats
- (U) Email likely gives way to SSL sessions with central server(s)

(S//SI//REL)	SIGINT Access	SIGINT Value	Automated Analytics
Old IR.21s	Easy	Great	Nearly impossible
RAEX IR.21s	Difficult	Even greater!	Easy!



# Targeting Efforts

(U//FOUO)

- (S//SI//REL) MNO roaming coordinators, hubs, GSMA working groups, ROAMSYS
- (S//SI//REL) ~100% of MNOs in WPMO's Top 20

Category	Contains...
4002	IR21 senders/receivers
3918	GSMA and SIGDEV



Tag	Contains...
AGIR21	IR21 senders/receivers
AG_USER	Individual (usually sender)
AG_ALIAS	Alias (usually receiver)
MCC/MNC [###][###]	IR21 s/r for given network
AGRAEX	RAEX working groups
roaming hub	Roaming hub contacts



# Email Address Selectors

(S//SI//REL)

**Filter Criteria**

Org Designator	Team	Batch Taskable
Category [REDACTED]	Zipcode	All [dropdown]
Tag MCC/MNC [REDACTED]	Realm All	Place Name [REDACTED]
Target Type All [dropdown]	Targeting Nationality IR [dropdown]	Selector [REDACTED]
Targeting Status Tasked [dropdown]	Targeting Location IR [dropdown]	Target Name [REDACTED]
	Create Date >= mm/dd/yyyy [text]	Target Shareable Name [REDACTED]
		Create Date <= mm/dd/yyyy [text]

**Selector Information**

Display 25 [dropdown]		Page 1 of 1				Total Records: 6			
Select All	Clear All	Normalized Selector		Target Shareable Name		Interest	Targeting Interest	Targeting Status	Task
<input type="checkbox"/>		[REDACTED] <emailAddr>		[REDACTED]		<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="button" value="Task"/>
<input type="checkbox"/>		[REDACTED] <emailAddr>		[REDACTED]		<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="button" value="Task"/>
<input type="checkbox"/>		[REDACTED] <emailAddr>		[REDACTED]		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="button" value="Task"/>
<input type="checkbox"/>		[REDACTED] <emailAddr>		[REDACTED]		<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input type="button" value="Task"/>
<input type="checkbox"/>		[REDACTED] <emailAddr>		[REDACTED]		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="button" value="Task"/>
<input type="checkbox"/>		[REDACTED] <emailAddr>		[REDACTED]		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="button" value="Task"/>

UTT v3.2 SP1 - Task Selector Search  
Dynamic Page -- Highest Possible Classification is TOP SECRET//COMINT//REL TO USA, AUS, CAN, GBR, NZL



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# Notable Successes

- (TS//SI//REL) Characterization of IR.21 collection from 67 high-priority networks (DSD)
- (TS//SI//REL) Most recent IR.21s from Egypt (S2E)
- (S//SI//REL) Assessment of IR.21 collection related to a possible new Chinese network (S2B)
- (S//REL) Sole source of IR.21 collection, ingest, and processing for RONIN; >200% improvement (NAC)
- (S//SI//REL) Working toward enterprise sharing of licensed, commercial data
  - Today: WiMAX data with JUBILEECORONA (S3516)
- (TS//SI//REL) Reporting on GSMA standards and practices



# Future Plans

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- (S//SI//REL) RAEX IR.21 collection and ingest providing more query possibilities including:
  - LTE information
  - Technologies/Equipment
  - Frequencies
- (S//SI//REL) AURORAGOLD user interface enabling SIGINT production chain access for querying and trending
- (S//SI//REL) NKB partnership



# Discussion



(U)

- (S//SI//REL) What are your ideas, suggestions, and analytic needs with respect to:
  - roaming and network information discovery and development?
  - GSMA's standards setting activities?
- (S//SI//REL) What are we missing? Are there data elements we should seek out to help meet your needs?



# Work with us!



(U)

- (U//FOUO) To contact the AURORAGOLD team with an RFI, please use GLOBAL TIPPER

[“go GT”](#)



- (U//FOUO) WikInfo: [“wi AURORAGOLD”](#)
- (U//FOUO) Email: A large black rectangular box redacting an email address.

*UNCLASSIFIED//FOR OFFICIAL USE ONLY*

(U//FOUO) AURORAGOLD

# **(U) BACKUP SLIDES**

*UNCLASSIFIED//FOR OFFICIAL USE ONLY*



# AG/GSMA Reporting



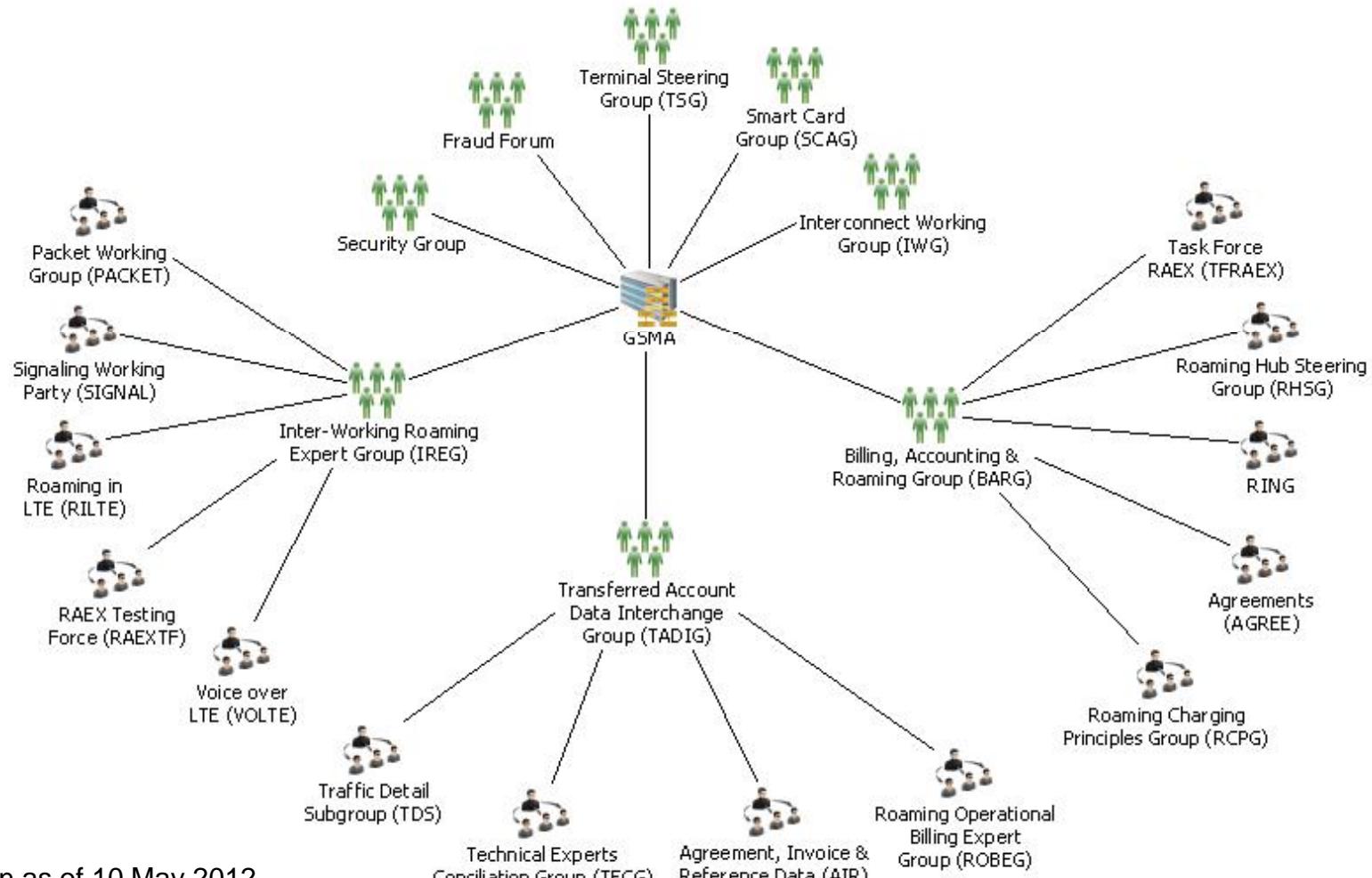
(S//SI//REL)

Serial	Topic
3/00/506998-11	(S//SI//REL) Libyan MNO information
3/00/556211-11	(S//SI//REL) Launch of RAEX; ROAMSYS and GSMA
3/00/515656-12	(S//SI//REL) GSMA standards releases/changes for 2012 (RAEX IR.21 and others)
2/00/502330-12	(S//SI//REL) GSMA database of Type Allocation Codes (TACs)



# GSMA Working Groups

(S//SI//REL)



(U) Known as of 10 May 2012



# IR.21 Data Extraction

(S//SI//REL)

## (U) Content

Field	AG	R
MCC/MNC	x	x
Operator name	x	x
Operator country	x	x
Email addresses	x	
Access point information		x
Autonomous system number		x
DNS names & IPs		x
Inter PLMN backbone IPs		x
GPRS Roaming Exchange (GRX)		x

## (U) Metadata/SRI

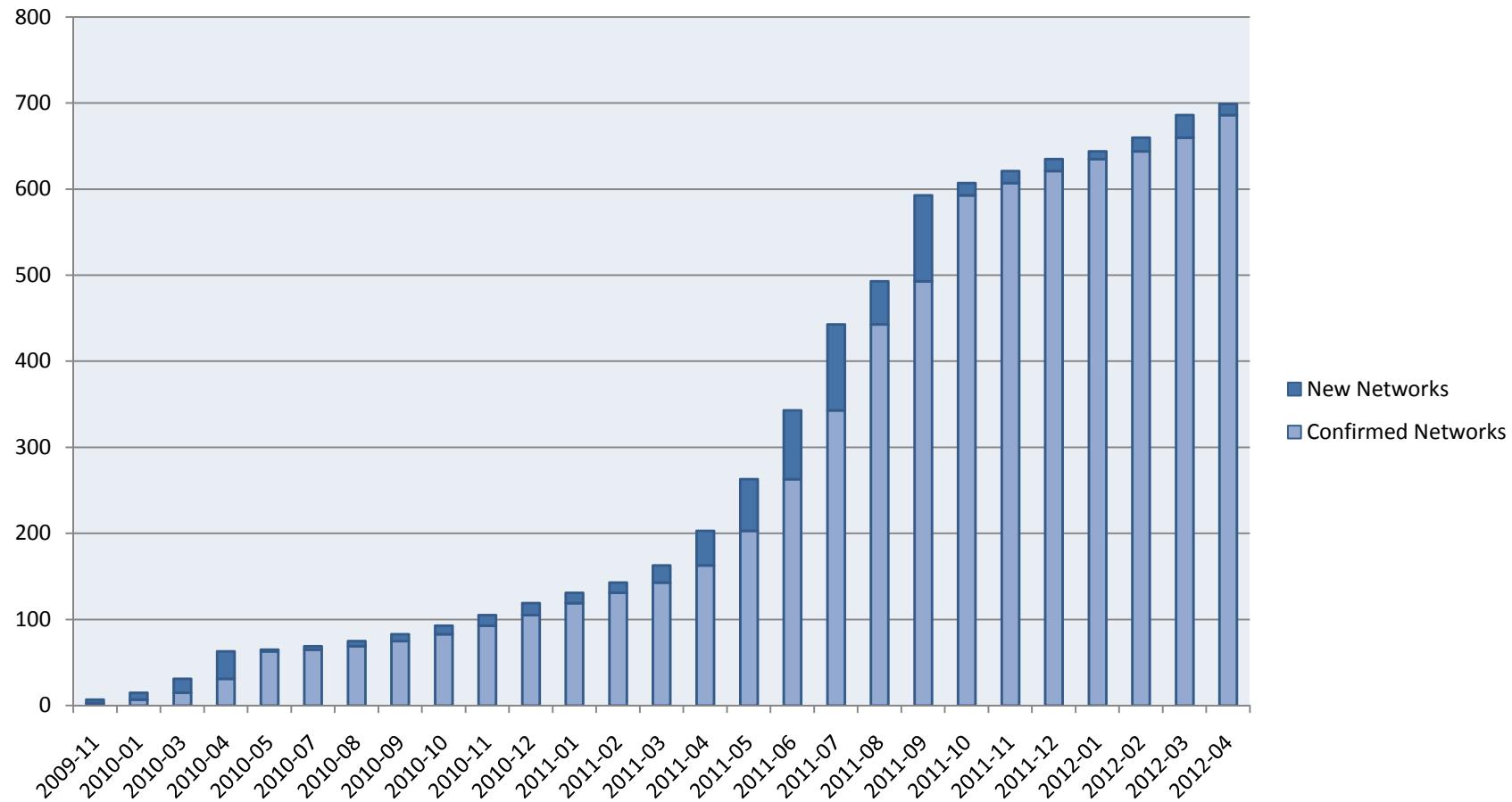
Field	AG	R
SIGAD	x	x
Case notation	x	x
PWID	x	x
PINWALE Date Time Group	x	x
PINWALE category & keywords	x	
Email "From" & date	x	
Source & destination IP	x	
Filename	x	
PDDG		x



# Metrics: Network Discovery

(S//SI//REL)

(S//SI//REL) GSM/UMTS/LTE Networks Discovered in SIGINT

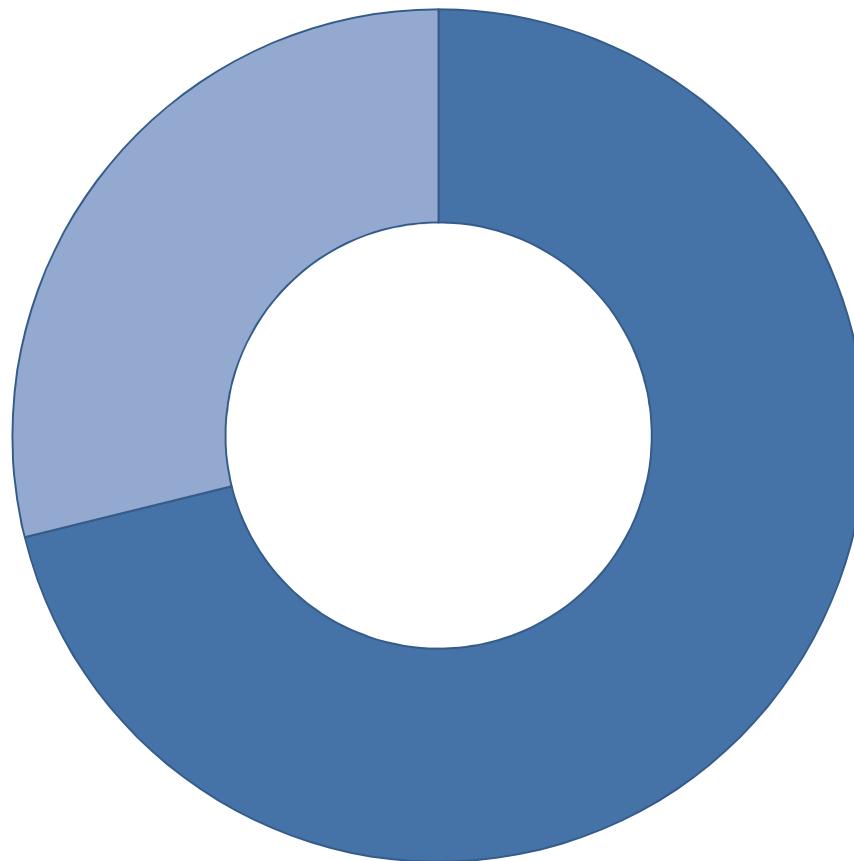




# Metrics: Network Discovery

(S//SI//REL)

(S//SI//REL) GSM/UMTS/LTE Network  
Coverage



- (S//SI//REL)
  - 701 confirmed
  - 985 estimated
  - 71%

(as of 15 May 2012)



# Network Coverage

(S//SI//REL)

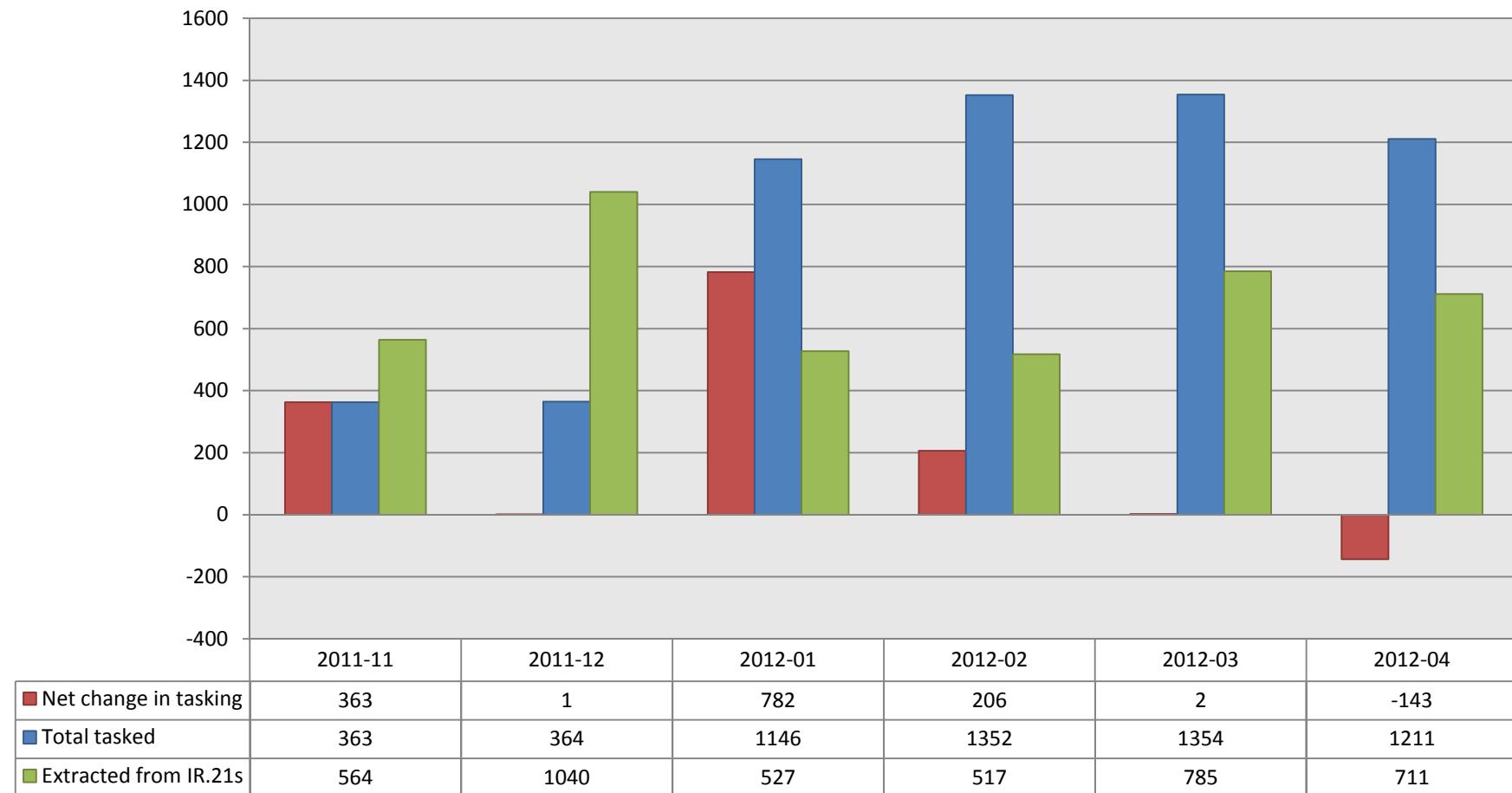




# Metrics: Tasking

(S//SI//REL)

(S//SI//REL) Strong Selector Targeting



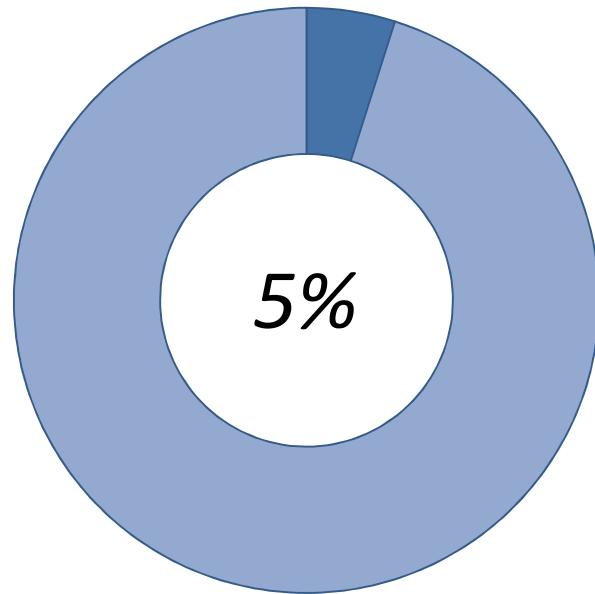


# RAEX Adoption in SIGINT



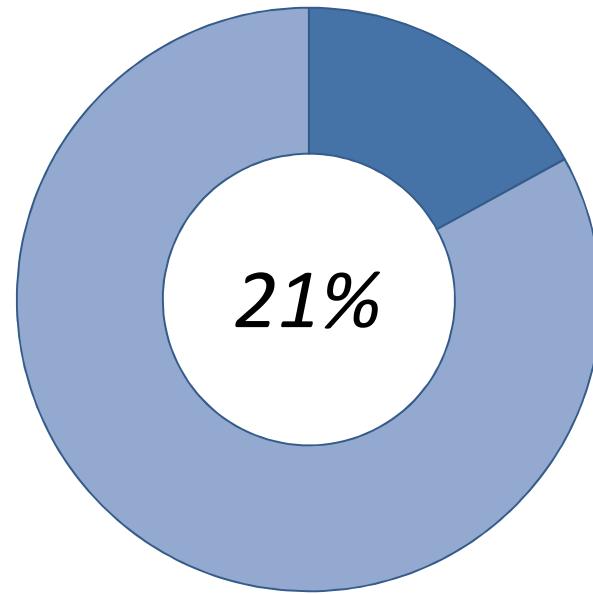
(S//SI//REL)

(S//SI//REL) What we've seen so far...



(S//SI//REL) 36/699 networks  
(Apr 2012; AURORAGOLD)

(TS//SI//REL) What we expect...



(TS//SI//REL) 202/985 networks  
(19 Apr 2012; 3/00/515656-12)