



Honor the Past, Shape the Future



MHS Initiatives

Maximizing our Access



Internet Development and Exploitation (INDEX)

Technical Director





Optimizing the Traffic Fairy

*Working across the IC to enhance tools
with the lessons we learn.*

- **ASPHALT** : *Collect it all*
- **BLACKTOP** : *Survey it all*
- **TARMAC** : *Process it all*
- **GTE / INDEX** : *Exploit it all*

MHS Environment

- 102 Satellites visible
- 56 Tasked satellites
- 178 Transponders (800 MHz)
- 51 GHz of Coarse BW
- 17 GHz of Occupied BW
- 8793 Signals
- Source: 2008 ROADBED Pull

Building Prototypes to Help us “Learn by Doing”



ASPHALT : “Collect-it-all”

“Why Can’t We Collect All The Signals, All The Time? Sounds like a good summer homework project for Menwith!” - LTG Keith Alexander talking about FORNSAT during a 16 June 2008 visit to MHS

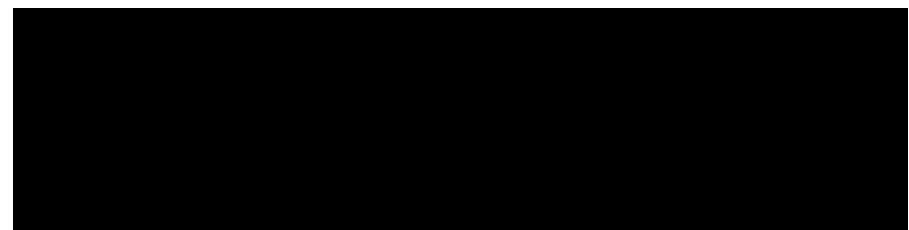
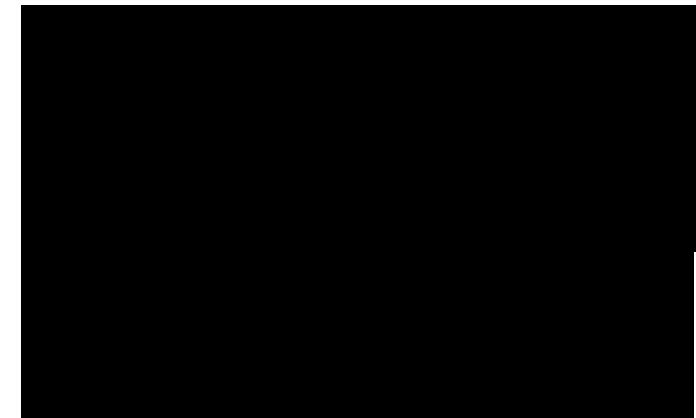
ASPHALT Approach / Principles

- **Focus on the middle 90%**
- **Attack the Bottlenecks**
- **Stress Scalability**
- **Experience to inform**

- **Minimize Complexity**
 - Strong Use of Standards
 - Loosely Coupled Components
 - Simplified Deployments, Maintenance, and Operations

- **Open, Service Oriented Architecture**
 - “Best of Breed” component selection
 - Heterogeneous components

- **Packetized Signal Distribution**
 - Near lossless & distortion free distribution
 - Enables a “data center” based solution





Honor the Past, Shape the Future

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BLACKTOP : “Survey it all”

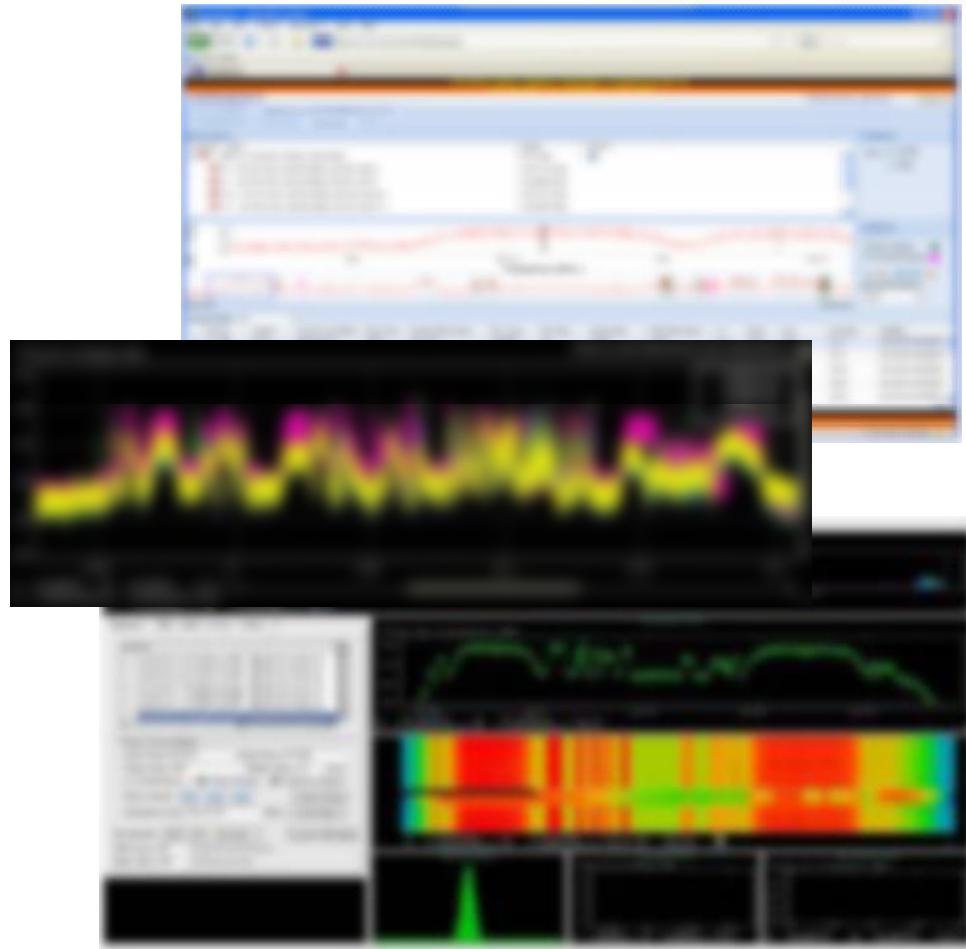
Today: MHS Surveys ~1K signals each month

Goal: Survey ~9K* signals every 2 weeks
by Nov. 2010

The Plan:

- Partner with existing tool providers to build a better survey suite
 - DARKQUEST (NSA)
 - EVIL EYE (GCHQ)
 - Spider (NRO)
 - ROADBED
 - SHAREDVISION / QUEST
- Add new capabilities to enhance corporate tools
 - Improve TDMA Detection
 - Incorporate new algorithms (e.g. Best guess demodulator)
 - Do more than just demodulate
 - Understand the target in context
 - Use survey to automatically drive sustained collection

Know our environment!



* There are approximately 9000 signals in the viewable arc at MHS, so this equates to all signals in our environment.

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TARMAC: “Process-it-all”



ASPHALT, NOSEYPARKER, Torus antenna & new missions
will produce more data than ever.

How can we scale up our access processing?

TARMAC is a Study to use Special Source Access Techniques in the FORNSAT / OH Realm:

- Supports GCHQ's OneIP Initiative
- Produces Single Line Records (SLRs) from MHS IP collection
- SLRs are sent to BLACKHOLE event database at GCHQ
- Query Focused Datasets (QFDs) are derived from this data to support analytic efforts

It's all about the metadata!
6,000,000 events / day





GTE at MHS : “*Exploit it All*”

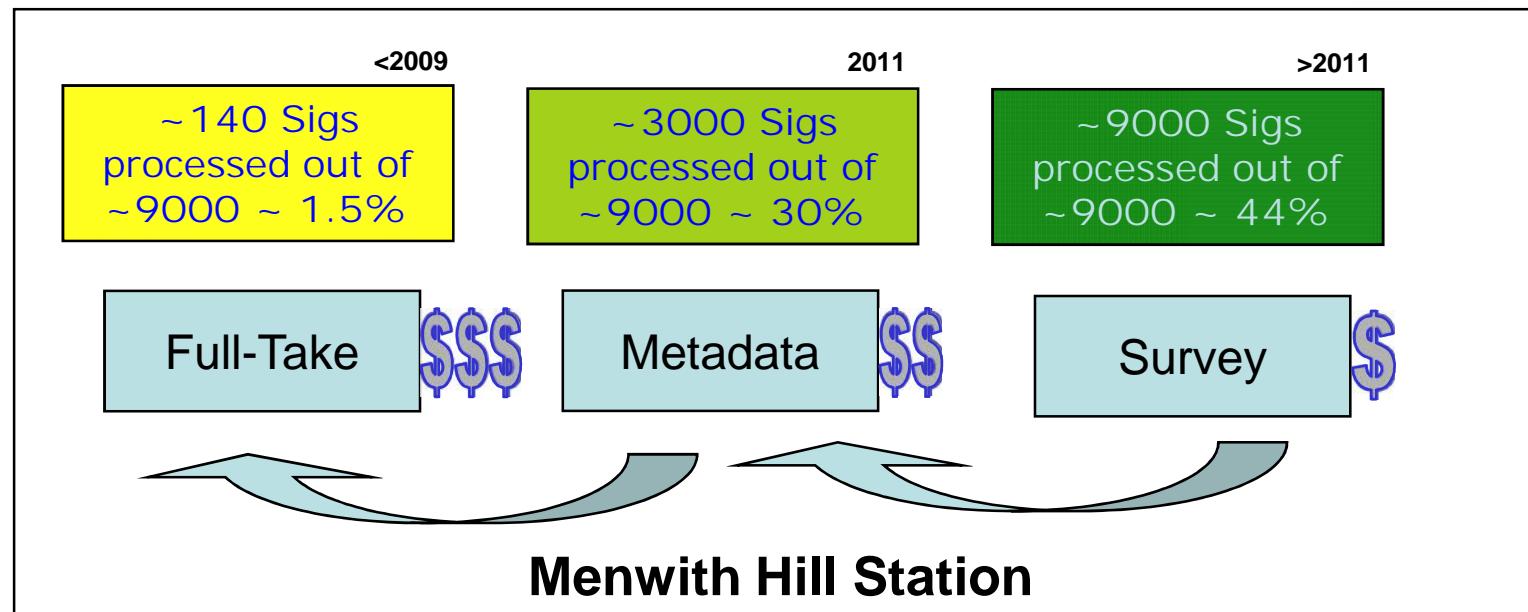


- Develop pioneering collection capability across the SIGINT community
- Established at MHS April 2010
- Increase value of MHS access
 - DNR data from NOSEYPARKER & Specials forwarded to Knowledge Bases
 - 175 MHS DNI links surveyed / day
- Protocol exploitation & development
 - Internet Application Protocol analysis
 - 80+ XKEYSCORE Signatures
 - Personal security products
 - Mobile internet applications





Access - Challenges



- Automatic promotion of data based on broad tasking authority
- If we can promote internally, why not across access?
- Need visibility of other accesses – does that include health and wealth?

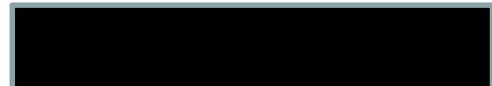


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Questions?



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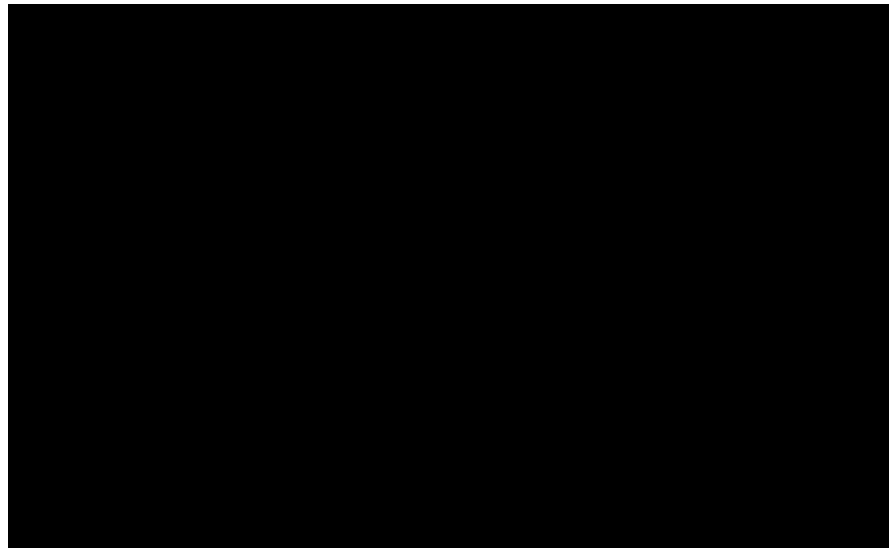
What's Next for ASPHALT?

BASSQUEST Tech Transfer

- NSA FORNSAT “Access-it-all” Architecture
- Radio service based on ASPHALT principles
- Yakima is the first scheduled deployment

Keep Improving the Prototype

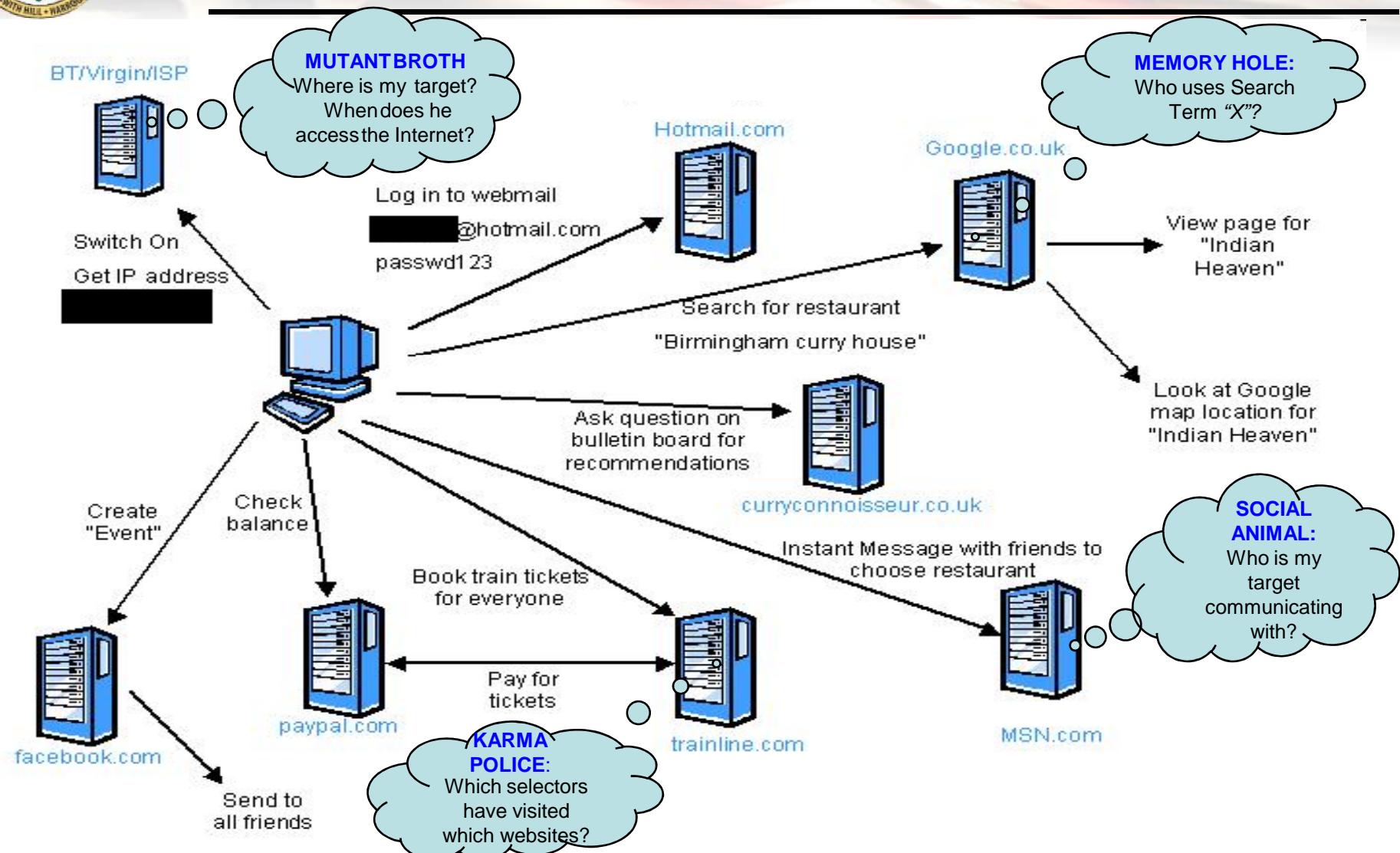
- Add more demodulators
 - R4 GNU Software radio
 - GRANDPIANO (Generic TDMA Architecture)
- Demonstrate cross-access support
 - NOSEY PARKER
 - Overhead
- Incorporate Geolocation Techniques
 - DIRNSA’s VSAT Geolocation Task
 - Coarse OH / FORNSAT Geolocation (FOGHORN)
 - APPARITION Collaboration



BASSQUEST Architecture



Organizing a Night Out





(U) Finding Targets with Metadata

