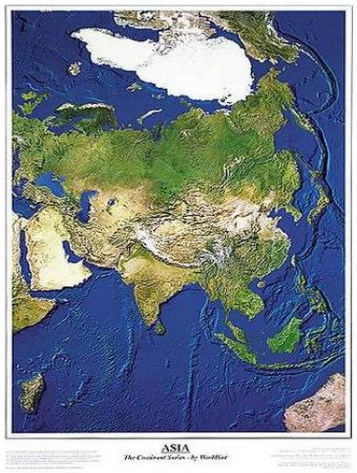


RED52

GVF Satellite. Solutions. The World.

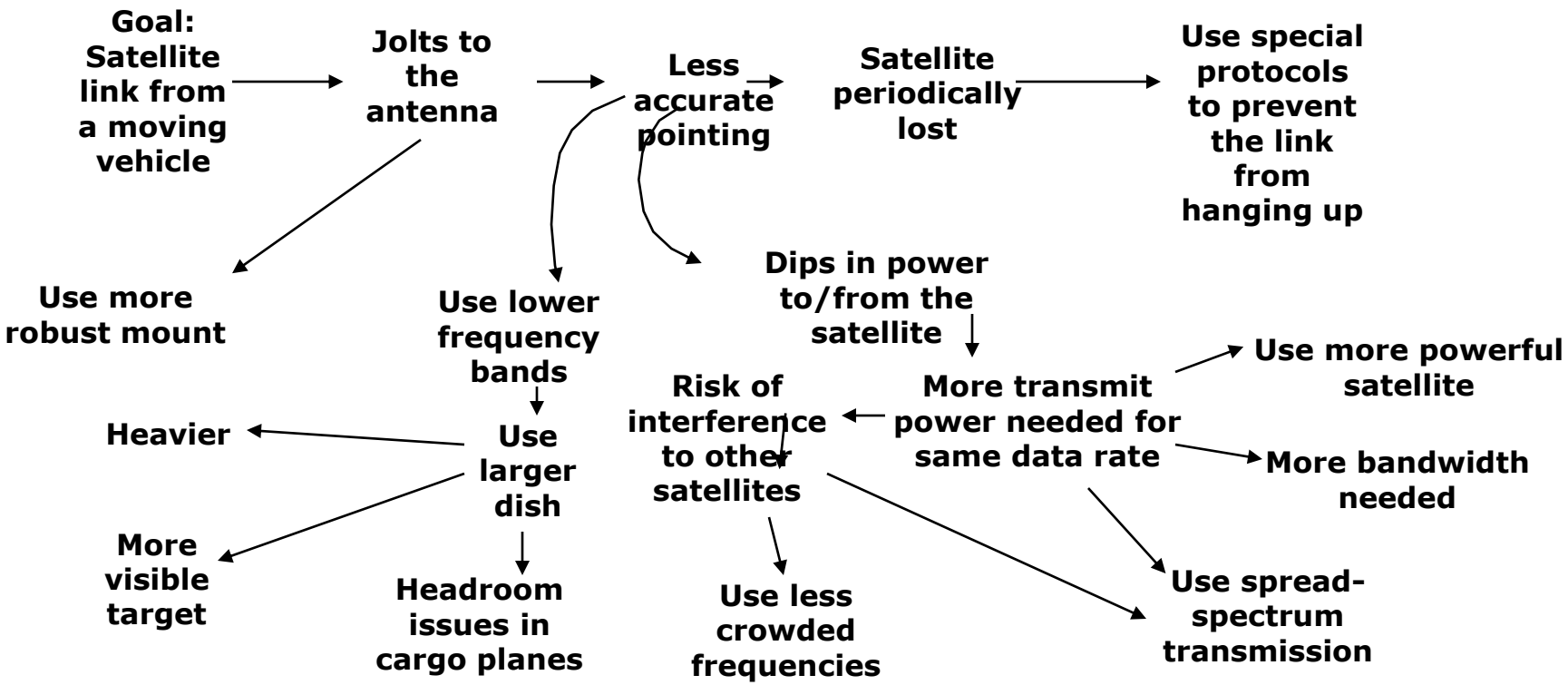
Global Interference Prevention

GVF *Industry Initiatives*

Sergio Murillo
Latin America Liasion
GVF

First… What About the Terminal?

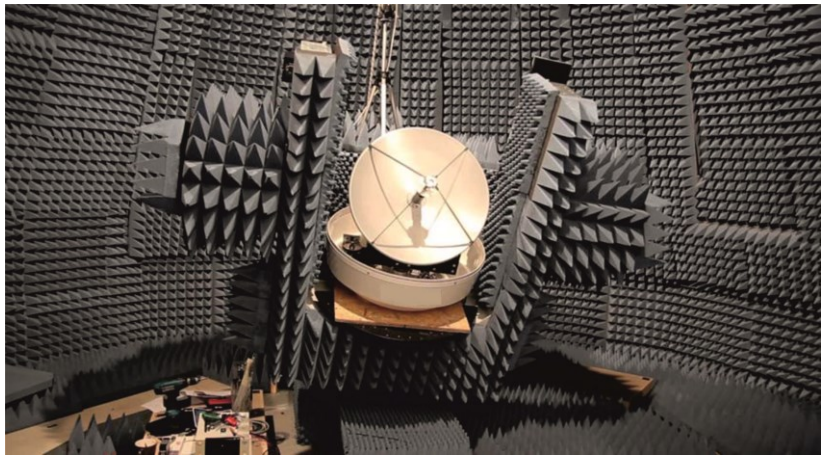
Interference Considerations: It's Complicated



Source: Euroconsult

Product Quality Assurance

- ✓ Minimum Performance Specifications
- ✓ Harmonised Spec-Sheet Terminology
- ✓ GVF 101 - 105 *
- ✓ Authorised Test Entities
- ✓ Test Range Validation
- ✓ Terminal Testing



GVF ATE: Fraunhofer IIS

* https://gvf.org/approvals/gvf-mra-documentation.html

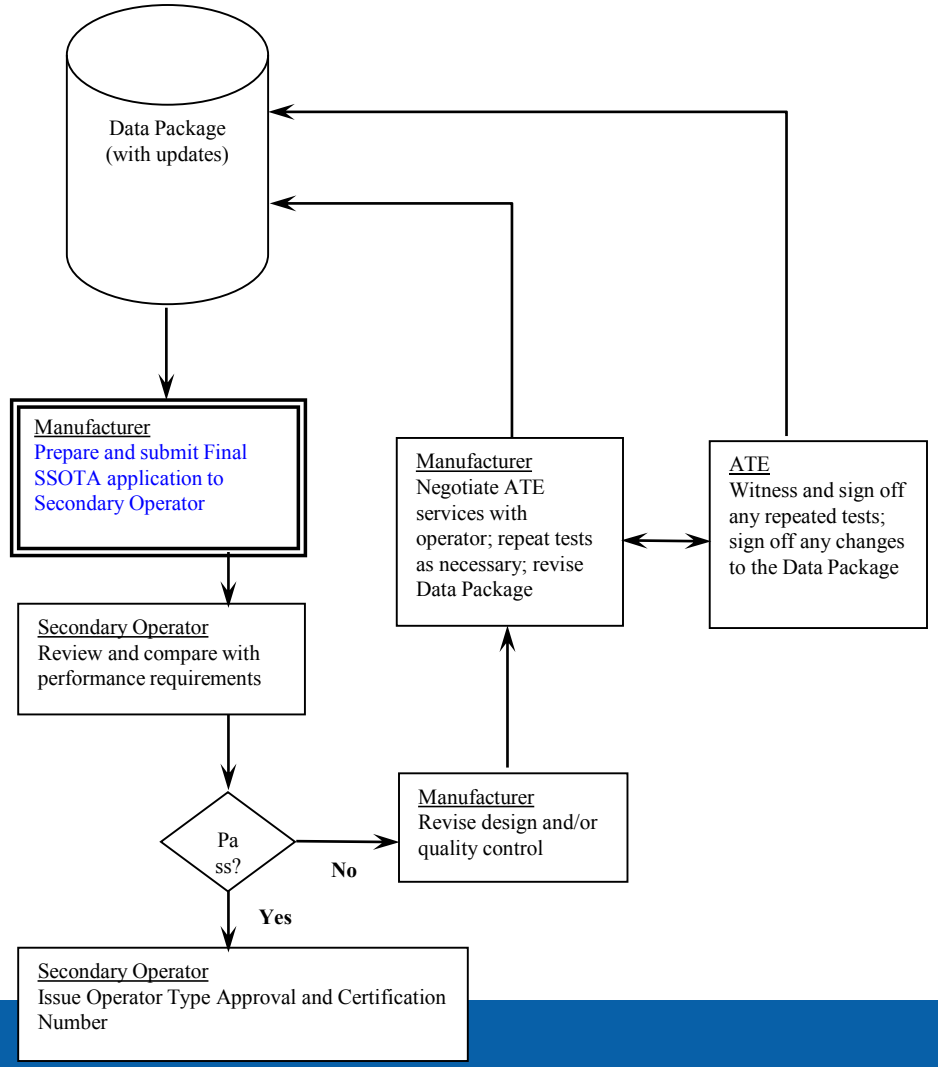
THE GVF-MRA

AS DEMAND FOR SATELLITE SERVICES GROWS, IT WAS QUICKLY REALIZED THAT A MORE EFFECTIVE SOLUTION WAS REQUIRED FOR APPROVING VSAT TERMINALS, OTHER THAN "ONE-TERMINAL-AT-A-TIME".

SOLUTION:

1. **GVF ESTABLISHED A FRAMEWORK WHEREBY INDEPENDENTLEY WITNESSED TESTS, CONDUCTED ON BEHALF OF ONE SATELLITE OPERATOR, WOULD BE RECOGNIZED BY OTHER OPERATORS WITHOUT THE NEED FOR ADDITIONAL TESTING.**
2. **THE GVF-MRA WAS CREATED TO ACT AS A NON-ALIGNED, INDEPENDENT ENTITY TO FACILITATE THE PROCESS.**
3. **WORKING TOGETHER, THE GVF-MRA AND SATELLITE OPERATORS DEVELOPED TYPE APPROVAL TEST DOCUMENTATION.**

THE GVF-MRA PROCESS



1. ***APPLICANT SUBMITS PHASE 2 TEST TO SSOTA.***
2. ***SSOTA REVIEWS REPORT AND GRANTS APPROVAL OR:***
3. ***SSOTA REQUESTS ADDITIONAL TESTS AND INFORMATION***
4. ***APPLICANT CONDUCTS ADDITIONAL ATE WITNESSED TESTS.***
5. ***APPLICANT SUBMITS REVISED REPORT TO SSOTA.***
6. ***SSOTA GRANTS APPROVAL.***
7. ***IT APPROVAL IS DENIED, APPLICANT HAS THE OPTION OF REPEATING TESTS***

GVF-105:
Satcom on the Move

- **DOCUMENT PRESENTS BEST PRACTICES FOR QUALIFYING COTM TERMINALS OPERATING IN C, X, Ku & Ka BANDS WITH SATELLITES IN FIXED GSO ORBIT LOCATIONS.**
- **COTM TERMINALS ARE FULLY STABILIZED AND MAY BE OPERATED FROM LAND, SEA OR AIRBORNE MOVING VEHICLES.**
- **ADITIONALLY, ANTENNAs USED IN COTM TERMINALS MUST SATISFY THE REQUIREMENTS OF GVF-101.**

ADDITIONAL PERFORMANCE / TEST REQUIREMENTS:

- **SATISFY DESIGNATED Co- & X-POL OFF-AXIS EIRPSD MASKS.**
- **DEMONSTRATE Tx INHIBIT FUNCTION IF THE BPE LIMIT OF 0.5º IS EXCEEDED FOR > 100 ms (TYPICAL SPECIFICATION)**
- **MAY USE COOPERATING ADJACENT SATELLITES FOR PRECISE ALIGNMENT.**

Land Mobile Campaign in Millbrook Proving Ground: Belgian Pavé

- **1.45 km of engineered block paving**
- **Straight section laid *rough* with cross ditches and random depressions**

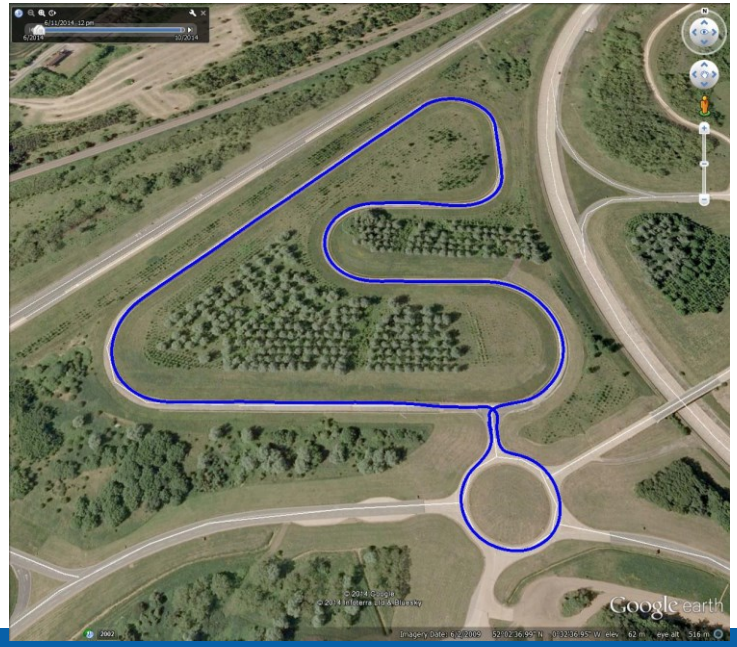


Figure: GPS position of Belgian Pavé track

Figure: Snapshot of Belgian Pavé

Land Mobile Campaign in Millbrook Proving Ground

- **Highly aggressive road surface**
- **Maximum gradients between 26% and 35%**
- **Maximum ditch depth 3.5 m**

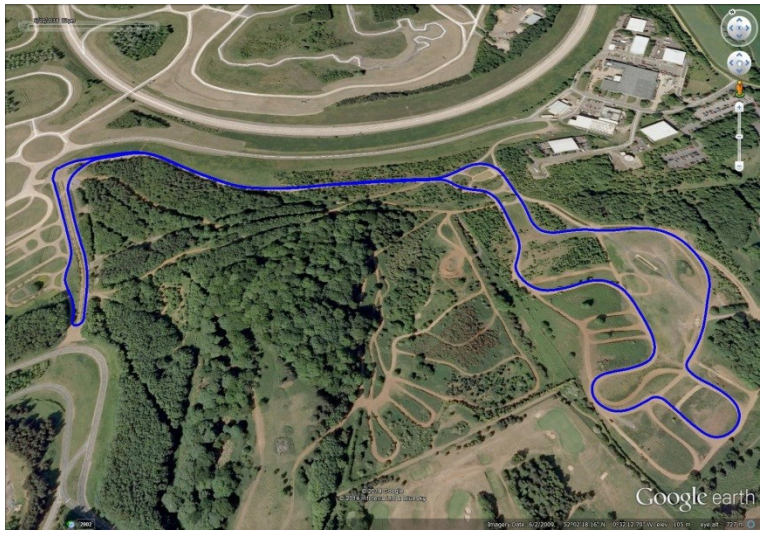


Figure: GPS position of Berm Road / Gravel Hills / Deep Ditches track

Figure: Snapshot of Berm Road / Gravel Hills / Deep Ditches track

Next Steps

- Implementing global test program now
- Addresses fixed and mobile antennas
- All primary frequencies (C, X, Ku, Ka)
- Minimum Performance Specification
- Any additional test requirements (e.g. from operator, regulators, etc.)
- Helping to promote approved products!

Training & Certification

- ✓ Nearly 14,000 Enrolled Techs
- ✓ Nearly 200 Examiners
- ✓ 30+ Courses
- ✓ Subscription Platform Launched
- ✓ Awards from SSPI, ACC
- ✓ Expanding to Reach Users
- ✓ New Classroom Training

  (Standard & Bespoke)

Maritime

Corporate

Backhaul

Peace Keeping

Disaster Preparedness

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The Spectrum Crunch

WRC-15

- ✓ Breakthroughs at C, Ku, Ka, Q, V… But
- ✓ Extended C Nearly Gone
- ✓ Threat of LTE Interference to 3.4 - 4.2 GHz

WRC-19

- ✓ Wireless Lobby in Overdrive
- ✓ C, Ka, Q and V Primary Targets
- ✓ Satellite Campaign Underway

Source: WiMAX Forum

Warning Signs: Previous Regional Positions

Every world region has indicated candidate bands above 31GHz

31.8 – 33.0 GHz	At least 1.2 GHz contiguous spectrum available for global harmonization
66-71 & 71-76 GHz	Supported by all regions with an established position
81–86 GHz	Supported by most regions

Asia Pacific

From	To
25.25	25.5
31.8	**33.4**
39	47
47.2	50.2
50.4	52.6
66	**76**
81	**86**

The Americas

From	To
10	10.45
23.15	23.6
24.25	27.5
27.5	29.5
31.8	**33**
37	40.5
45.5	47
47.2	50.2
50.4	52.6
59.3	**76**

Europe CEPT

From	To
24.5	27.5
31.8	**33.4**
40.5	43.5
45.5	48.9
66	**71**
71	**76**
81	**86**

Russia RCC

From	To
25.25	27.5
31.8	**33.4**
39	40.5
40.5	41.5
45.5	47.5
48.5	50.2
50.4	52.6
66	**71**
71	**76**
81	**86**

Arab Region

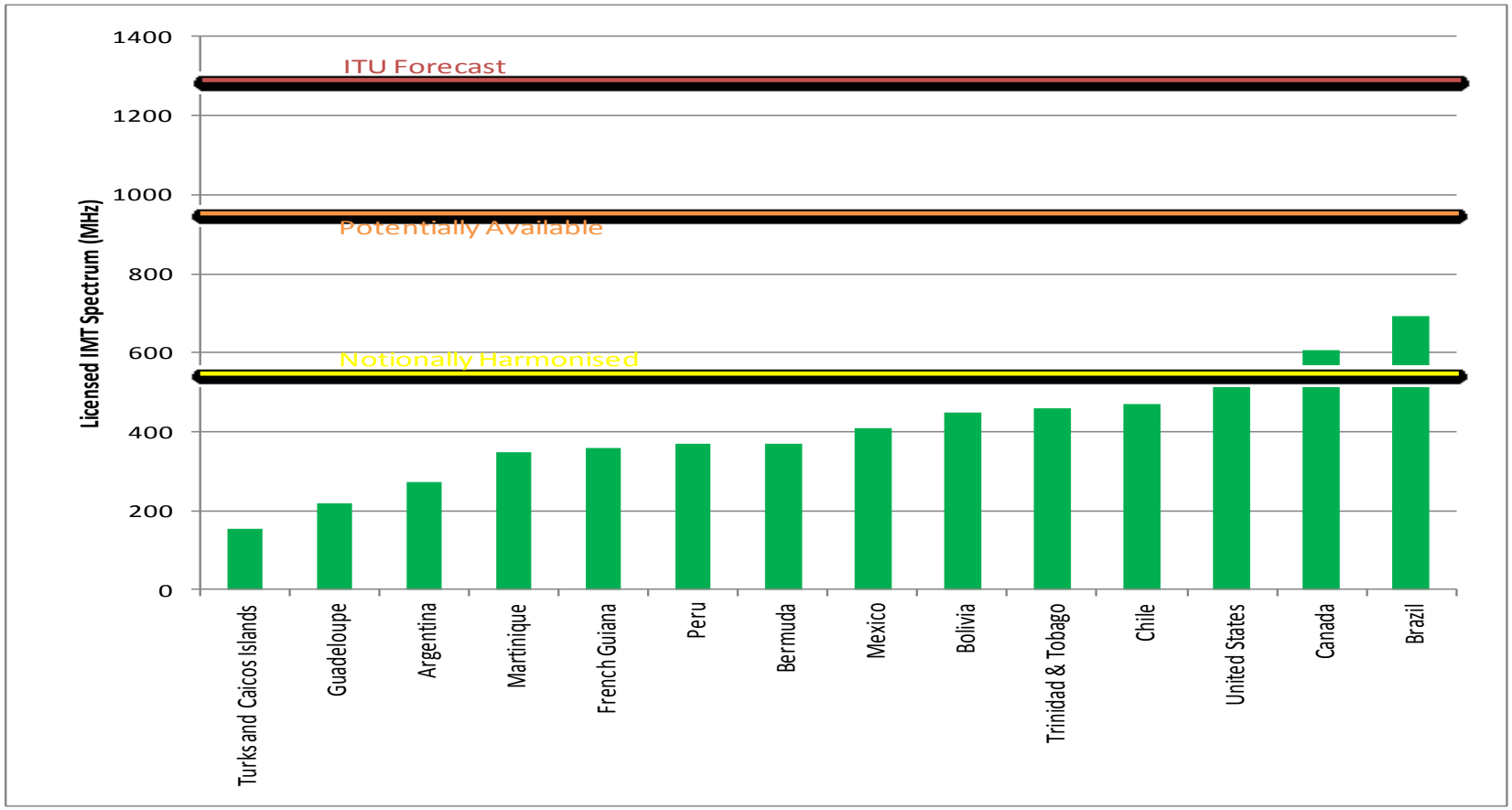
From	To
Above 31GHz	
&	
BY IMPLICATION	
66	**71**
71	**76**
81	**86**

WRC-19: Key Agenda Items

- **1.6: Regulatory framework for NGSO** FSS satellite systems in 37.5-39.5 GHz (space-to-Earth), 39.5 42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space)
- **1.13: Identification of bands for IMT**, including possible additional allocations to the mobile service on a primary basis
- **1.14: Regulatory actions for HAPS**, within FSS allocations
- **9.1.3: Regulatory provisions for NGSO** in 3 700-4 200 MHz, 4 500-4 800 MHz, 5 925-6 425 MHz and 6 725-7 025 MHz bands allocated to FSS
- **9.1.7: Urgent studies** for unauthorized operation of earth stations

Is Sharing Necessary?

IMT spectrum licensed in Region 2



Source: LS telcom

Interference Stakeholders

Wireless Extension Services

Maritime Communications

Aviation Security

Corporate Networks

Telemedicine

Distance Education

Internet Connectivity

Peace Keeping

TV contribution

Disaster Preparedness

Strengthening Cyber-Security

- **Formation of Cyber-Security Task Force**
- **Establishment of Best-Practice Guidance**
- **Outreach Underway to…**
  - National Administrations
  - Users
  - Industry

The GVF Cyber-Security Policy Guideline

Created by the members of the GVF task force
with counterpart group at Satellite Industry Association

Representation from vendors, network operators, end-users of VSAT (FSS/MSS)

Details steps being taken by satellite industry

Focus on how industry can work collaboratively with government
CORE Principles

Voluntary, industry-led efforts and public private partnerships to are the optimal way to address cybersecurity at the national or international levels.

Satellite industry organizations should actively address cybersecurity using industry best practices for risk management.

Robust cybersecurity is aided by voluntary information sharing, free from fear of adverse consequences.

In conclusion: This isn't going away.

Security scrutiny of the satellite industry is higher than it's ever been.

Exploitation of systems is widely discussed, and we should assume the bad guys are paying attention too – and using that knowledge maliciously.

GVF Security Task Force – a coordination center for satellite security knowledge

Vendors and network operators should implement robust protection, abandon widely discredited practices where they still exist.

GVF Satellite. Solutions. The World.

Thank You!

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