C-COM
SATELLITE SYSTEMS INC.

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C-COM – Pioneer in Mobile VSAT

- C-COM is an Ottawa-based technology company focused on research, development and design of fully motorized, auto-deploy, mobile satellite antenna products (iNetVu®).
- Established in 1997, C-COM is one of the largest Comm-On-The-Pause (COTP) mobile VSAT manufacturers in the world.
- Company is developing highly disruptive antenna technology (electronically steerable phased array).

Employees:	33
Exchange:	**TSXV: CMI** and **OTCQB: CYSNF**
Stock closing price:	$1.63 (Canadian)
Dividend yield:	3.1%
Market cap:	$68,111,832 (Canadian)

Note: As of November 30, 2022.

C-COM by the Numbers

10,000+:	iNetVu® commercial mobile VSAT systems sold
106:	Number of countries in which you will find iNetVu®
600+	Active dealer partners worldwide
40:	Models available of the iNetVu® auto-acquire, motorized antenna
10:	Modem manufacturers PLUG & PLAY Integrated with iNetVu® (35 different modem models)
8:	Sizes of antenna available (75cm, 80cm, 98cm, 1.0m, 1.2m, 1.5m, 1.8m and 2.4m)
4:	Formats of antenna (Driveaway, Flyaway, Manpack, Fixed Motorized)
4:	Bands of antenna available (Ka, Ku, C & X band)
$25,366,505:	Working Capital (as of November 30, 2022)
$21,545,753:	Shareholder Dividends Paid (as of November 30, 2022)
43:	Consecutive Quarterly Dividends
$0:	Debt

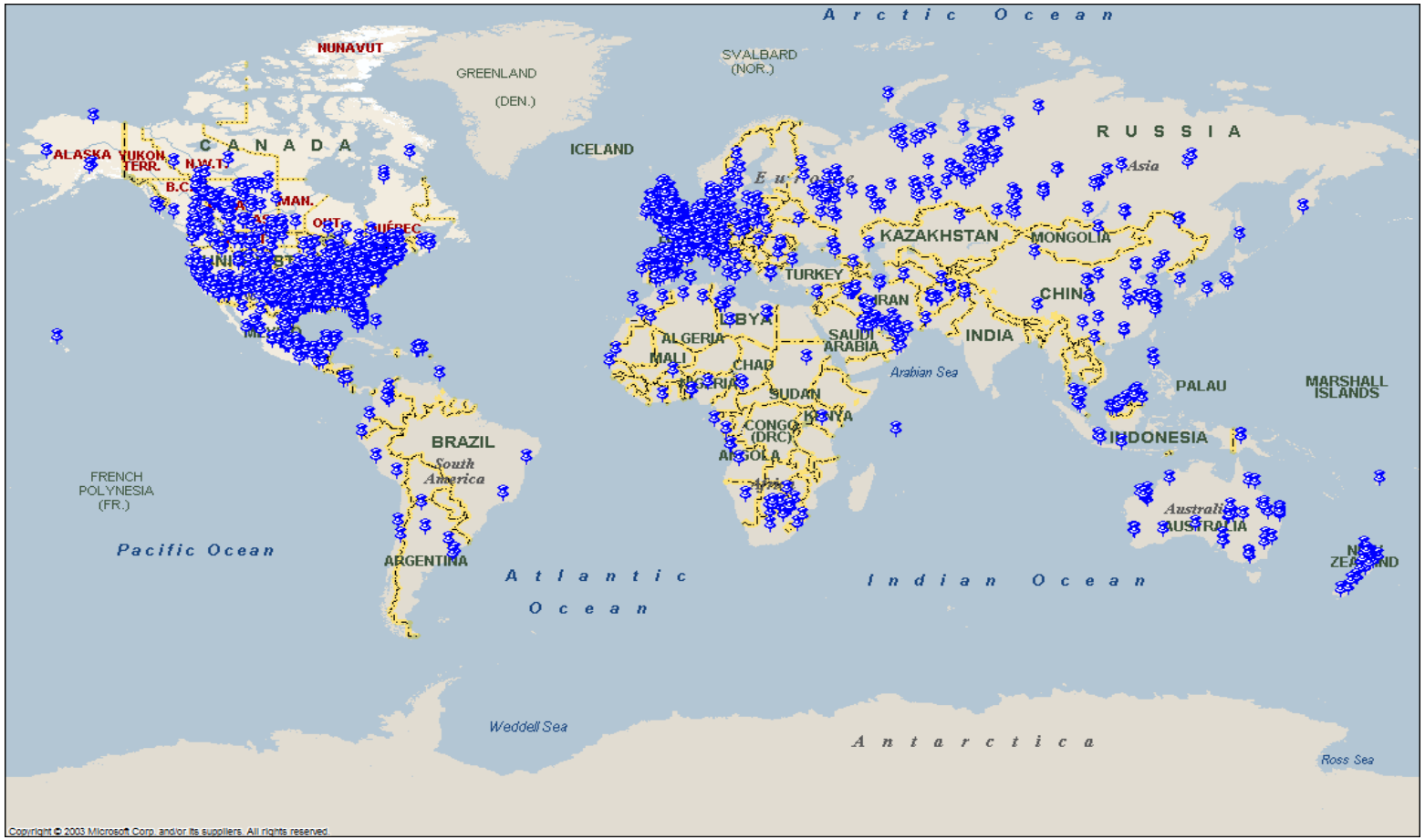
Note: As of November 30, 2022. All figures in $CAD

Commercial Markets Using Mobile SATCOM

- Government
- Military
- Emergency Response
- Disaster Recovery
- Blue Light Vehicles
- Oil & Gas
- Telecom Companies
- Banks
- Broadcasters
- Hospitals
- Schools
- Mining
- Events

Where terrestrial infrastructure is LIMITED DISRUPTED NON-EXISTENT Broadband Internet via Satellite is the ONLY option

Worldwide Deployment



iNetVu® Platforms (75cm – 240cm)

Ka Ku C X

DriveAways

Ka-74/G | Ka-75V | Ka-75VP/KASAT 980+/982 | Ka-98G/V/H/HJUP | 1200+ | 1202 | Ka-1202V | Ka-1202G | 1501 | 1801

FlyAways

ManPack

FLY-74/G | FLY-75V | FLY-981 | FLY-98G/V/H | ACFLY-1200 | FLY-1202 | FLY-1202G/V | FLY-1801 | MP-60/80/100

FMA's (Fixed Motorized Antenna)

FMA-121 | FMA-121Ka | FMA-180+/181 | FMA-241

The iNetVu Controller Series

- Simple stand-alone one touch operation to find satellite and stow antenna
- Typical satellite acquisition time in less than 2 minutes
- Ideal for applications that require a quick, simple setup and reliable connection
- Supports DVB-S1 and DVB-S2/ACM frequencies (modem independent)
- Optimal, high-precision antenna pointing, supports inclined orbit satellites
- Remote access and operation via Network, Web and other Interfaces
- Built-in motion and movement protection for safety
- Integrated with 20+ modems (Hughes, Gilat, Viasat, iDirect, Comtech,iPStar, etc.)
- 7 methods of finding satellite

C-COM SATELLITE SYSTEMS INC.

74cm Auto-Acquire Ka-band DriveAway (Eutelsat, Hughes & Gilat)

iNetVu® **Ka-74X**

Ka

NEW GEN

Ka-74G

eutelsat
type approved for KA-SAT

- G – Eutelsat/Konnect Approved; also compliant with Gilat (SkyEdge) Ka services

Ka-74H-JUP

HUGHES

- H-JUP- Hughes Jupiter modems. The Ka-74HJup is suitable to operate with HNS Jupiter Networks

iNetVu®7715Controller

98cm Auto-Acquire Ka-band DriveAway (Hughes, ViaSat, Avanti & Gilat)

Ka

NEW GEN

iNetVu® Ka-98X

(G/V/H/H-JUP)

iNetVu®7710Controller

Ka-98G

avanti Approved Compatibility

THOR 7

Ka-98V

eutelsat type-approved for KA-SAT

ViaSat

Ka-98H

avanti Approved Compatibility

YahClick

Ka-98HJUP

HUGHES

- G - Avanti Approved; Thor7 Type Approved; also compliant with Gilat (SkyEdge) Ka services
- V - Exede by ViaSat / KA-SAT satellites using ViaSat Broadband Modems. Auto beam select is available on the KA-SAT Tooway service.
- H - Hughes Ka-band modems. The Ka-98H is suitable to operate over the Yahsat Yahclick network, and will be adapted as more networks become available.
- H-JUP- Hughes Jupiter modems. The Ka-98HJup is suitable to operate with HNS Jupiter (NA)(1), YAHSAT (MENA)(1) and Avanti(1)
- Pod option available

(1) Supported Radios Spaceway or Jupiter. Please specify which radio being used when ordering.
http://www.avantiplc.com/avanti-approved-compatibility

New Generation 1.2 m Auto-Acquire Ku-band DriveAway

Ku

NEW GEN

iNetVu® 1202

eutelsat characterized

Ka-band or Ku-band

- Field Upgradable to Ka-Band
- Low Stow, high-precision antenna pointing, near zero backlash
- Excellent Cross-pol performance
- Based on Eutelsat approved Skyware 1.2m Antenna, Type 125
- Works on all Ku Supported Services
- Characterized with Eutelsat* and Intelsat Compliant
- Patented sleek aerodynamic form (Patent # D696649 & D696650)
- Optimal high-precision antenna pointing
- Wind deflector pod (optional)
- 2-piece thermoset-molded reflector (optional)

C-COM SATELLITE SYSTEMS INC.

iNetVu® by C-COM

1.2 m Auto-Acquire FlyAway

iNetVu® FLY-1202

FLY-1202G

FLY-1202V

- 1.2m FlyAway Antenna Designed for Ku and X Band
- Low cost, high precision antenna pointing, near zero backlash
- Setup less than 15 minutes
- Tool less, Captive H/W fasteners
- Fits in 4 Transportable Cases, under 35kg ea.
- Based on Eutelsat approved 1.2m Skyware antenna

iNetVu® ManPack

Ka Ku X NEW GEN

Manpack systems can be easily configured to provide quick access to satellite communications for any application that requires remote connectivity in a rugged environment.

Ideally suited for applications that require a quick, simple set-up; in vertical markets such as emergency response, disaster management, public safety, broadcast, media and more.

Simple to Assemble and Easy to Use

Manpack

Auto-Pointing System Option
Includes Onboard Controller

- Complete satellite acquisition in seconds
- Super quiet operation, no noise
- IP 66 Rating of whole system
- Assembly in 4-5 minutes without tools
- High precision reflector petal can be interchanged among one system and over multiple systems
- Multiple bands support: Ku, Ka, X
- Supports manual operation with handwheels and indicators

iNetVu® ManPack - MIL

Ka Ku X

NEW GEN

Manpack Deployment in Japan following Typhoon 19

Oil & Gas

FracTech – Texas, USA - 1200

ITC Global - Australia - FLY-1201

DiverseIt - Perth, Australia - 1200

TC Communication - Australia 1200

Oil & Gas – Halliburton - 980

Libya - Hermes - 1200

Sinopec - China - 1200

BSC - Beijing - 1200

Satellite News Gathering

WebTVLive OTT by C2D.eu - RTC Belgium Broadcaster - Ka-75V

DDish TV – Mongolia - 1201

Spar Woman's Day Race – Grintek – Africa - Ka-98H

SNG - ViaSat - USA - Ka-75V

SNG - Newspotter - Eusatnet (SatSpeed) Germany - Ka-75V

CCTV in China - Sichuan Earthquake - 1200

SNG - ARY News - Pakistan - 1200

Elections in Angola - Grintek - 1200

Emergency Response

Excelerate – UK - 1200

Landslide Disaster
JSC Japan - 980

Police Command Vehicle
Altegrosky – Russia - 1200

FireTruck - Xian - China - 1200

Fire Department - Japan - 1201

ER - Primetech – UK - Ka-75V

Disaster Recovery - Softbank - 980

Indonesia - 1200

TeleHealth

Telemedicine and Mobile Diagnostic Center Altegrosky - Russia - 1200

Mobile Heath - Remote Comm LLC Midland, TX - 1200

Mobile Surgical Satellite Service New Zealand - 1800

Loma Linda University – USA - 1200

Mobile COVID Vaccination Clinic – Hughes - US - 1200

Mobile Health Care Services Siberia - 1200

Breast Screening - NZ - 980

Transnet Phelophepa Health Train Grintek - South Africa - 1200

Military

Polish Military - TTCom - 1800

Military – Russia – 1200 & 980

Russian Police Vehicle - 1200

Military - Russia - 1200

Military - 1200 transported on a Russian IL-76 Cargo Plane

Russian Military - Fly-1201

Military Forward Operations Base – USA FLY-1201 - Carolina Satellite

Vietnam Military Vehicle -980

Telecom

Telecom – TFL – Fiji – 1200

Telecom – TFL – Fiji – 1200

Telecom - Numix -Broadband on Wheels - Malaysia- 1200

Telecom Malaysia Mobile Store Numix - 980

AT&T – UK - 1800

Telecom – China - 980

Telecom Malaysia - Numix - 1200

Telecom Malaysia - Numix -980

Mobile Office

Gov. pension programme Vox Telecom – South Africa – Ka-98H

Peru – FLY-981

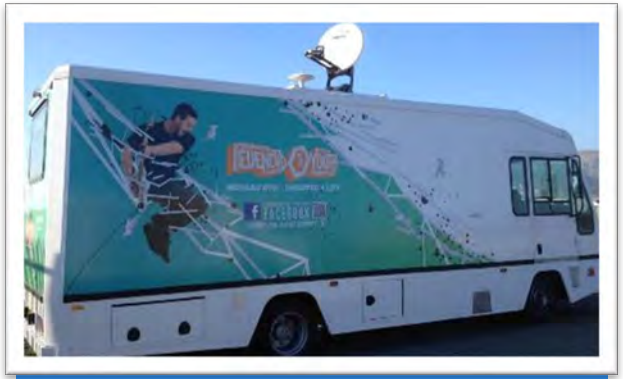
Telespazio – Demo – Germany- 981

Government - Mobile ID Vehicles Argentina - Telespazio - 1200

Mobile Sight Services - UK Primetech - 750

Mobile Office - Eskom South Africa - 980

Mobile Tax Office - Grintek South Africa - 980 - SARS



Youth Services - UK – Primetech - Ka-75V

Mobile Banking

NTI Soluciones – Spain - 1200

South Africa
Grintek - 980

UK - Primetech - Ka-75V

Numix - Malaysia 981

Transportable ATM Container
New Zealand - Bay City - 980

Coris Bank International - 980

Germany - 1200

SATCOM Business Innovating Aggressively

The Satellite business is a $46B market. Flat Panel Satellite Antennas represent a $17B opportunity over the next decade.

Many big players, with very ambitious projects, are now getting involved:

OneWeb
(UK+Bharti-India)
648 Satellites

Musk (SpaceX)
4408 microsats

Bezos (Amazon-Kuiper)
3,236 satellite constellation

Telesat Lightspeed
188

Boeing 132

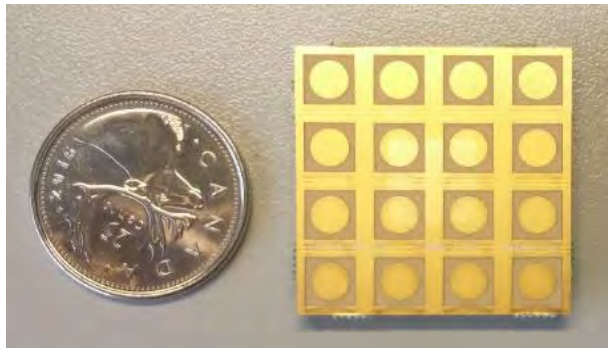
Gates funding
Kymeta

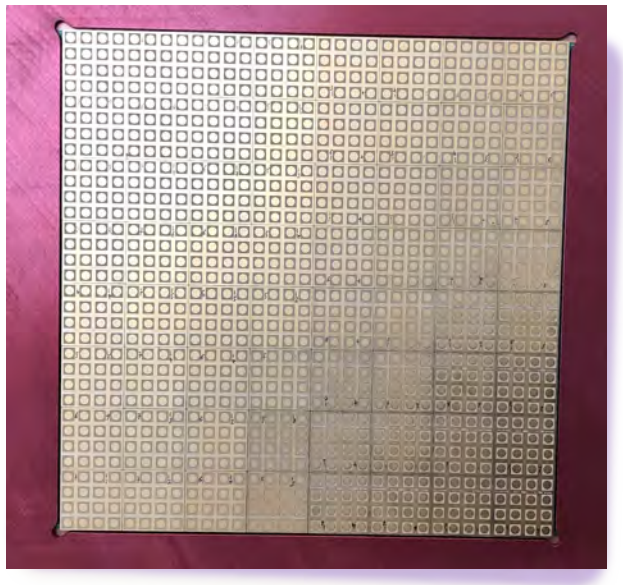
Entering the GOLDEN AGE OF the SATELLITE BUSINESS?

O3B, SpaceX, Amazon, Inmarsat, Telesat, Viasat, Intelsat, Hughes, Kepler, Boeing and others have large-scale goals.
All of these grand schemes require antenna design expertise.
All require reliable & high precision ground station antennas.
Can they be cost effective?

Low Cost Phased Array Antenna System for Ka-band Mobile SOTM

- C-COM Satellite Systems, in partnership with the University of Waterloo, is creating its first Phased Array Antenna (PAA).
- C-COM tested its Ka-band Phased Array modules using the company's **patented phase shifter technology** in 2020.
- **The proof-of-concept prototype has been successfully concluded by satellite tests in 2021.**
- The concept is based on modules that are small, but contain everything — the antenna, plus the electronic circuit, parts of the control circuitry, and local memory.





16x64 RX 4x4 Modules
(1024 Elements)

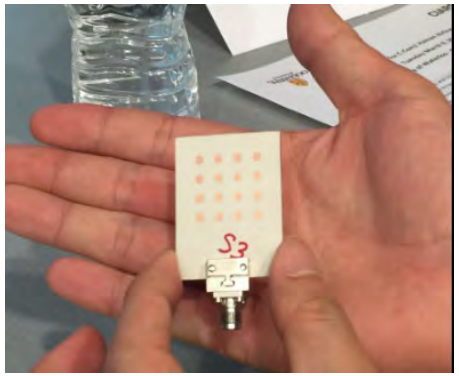
Advantages of Proposed Technology

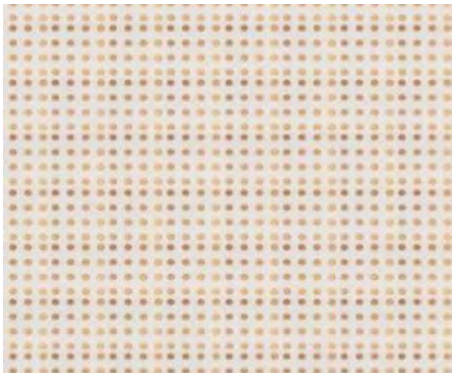
INTELLIGENT CHIP BASED TECHNOLOGY

- System can have full control over each module
- Can perform electronic beam steering
- Can optimize the beam
- Can electronically scan 360 degrees
- **Scalable**
  - Gain can be increased by adding multiple modules
  - Allows for small building blocks which can be used

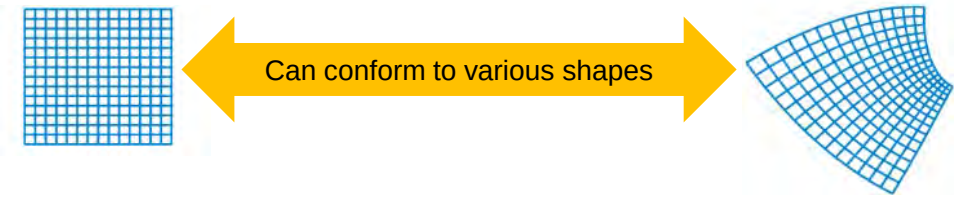
  to make any size of antenna;
- **Conformal**
  - Bends to fit various shaped surfaces

- **Dramatic cost reduction**
  - One antenna consists of several thousands chips, a few hundred antennas could reach a volume of millions of chips.
  - It will be easy to reach “economies of scale”, leading to significant cost savings.
  - Applicable to many vertical markets



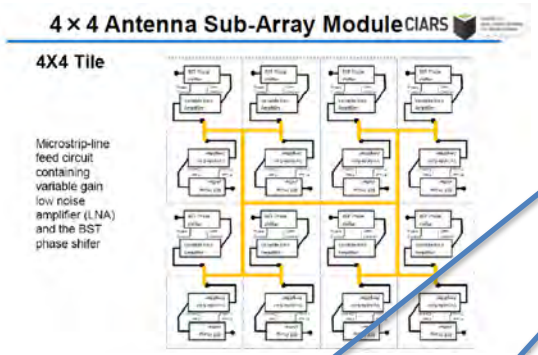


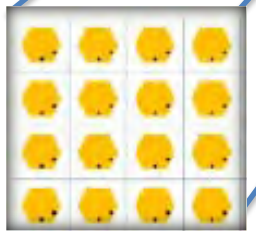
CIARS CENTRE FOR INTELLIGENT ANTENNA AND RADIO SYSTEMS



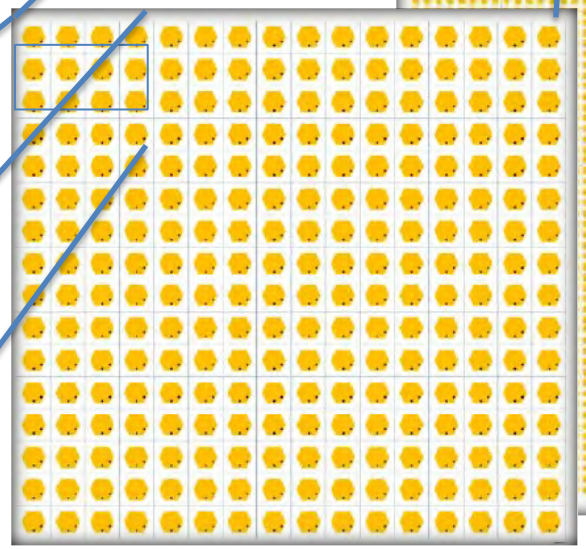
Scalable Architecture: 4x4 to 16x16 to 80x80 Antenna Sub-Arrays

CIARS CENTRE FOR INTELLIGENT ANTENNA AND RADIO SYSTEMS

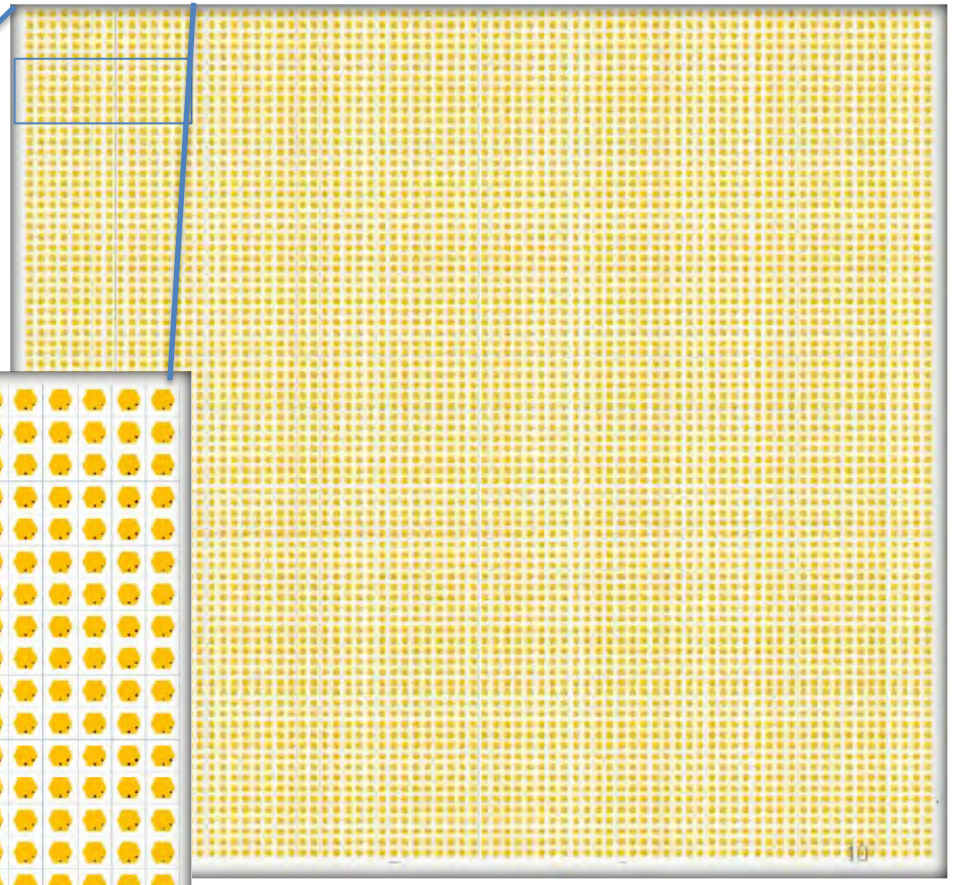




4x4 Sub-array Module



16x16 Sub-array Module

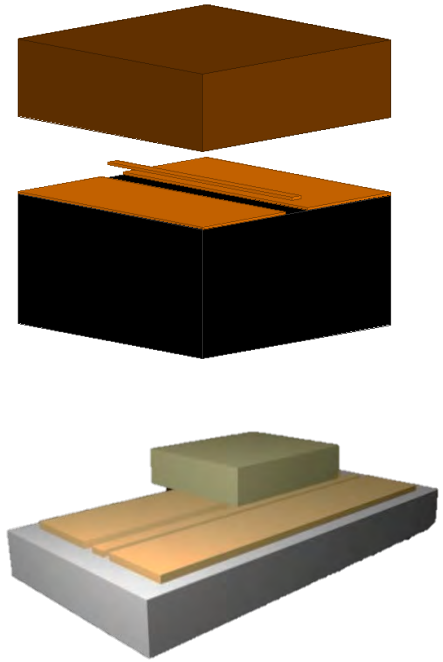


80x80 Array Panel

made of 25 of 16x16 sub-arrays

Novel Dielectric-Based Patented Phase Shifter

- Operating Principle:
- Based on coplanar waveguide (CPW) combined with a dielectric slab (BLT ceramic) and High Resistivity Silicon (HRS) ;
- Phase shift is tuned by reconfiguring the phase shifter components via physical actuation;
- Distances can be changed using piezoelectric transducers or micro-electromechanical systems (MEMS) actuators

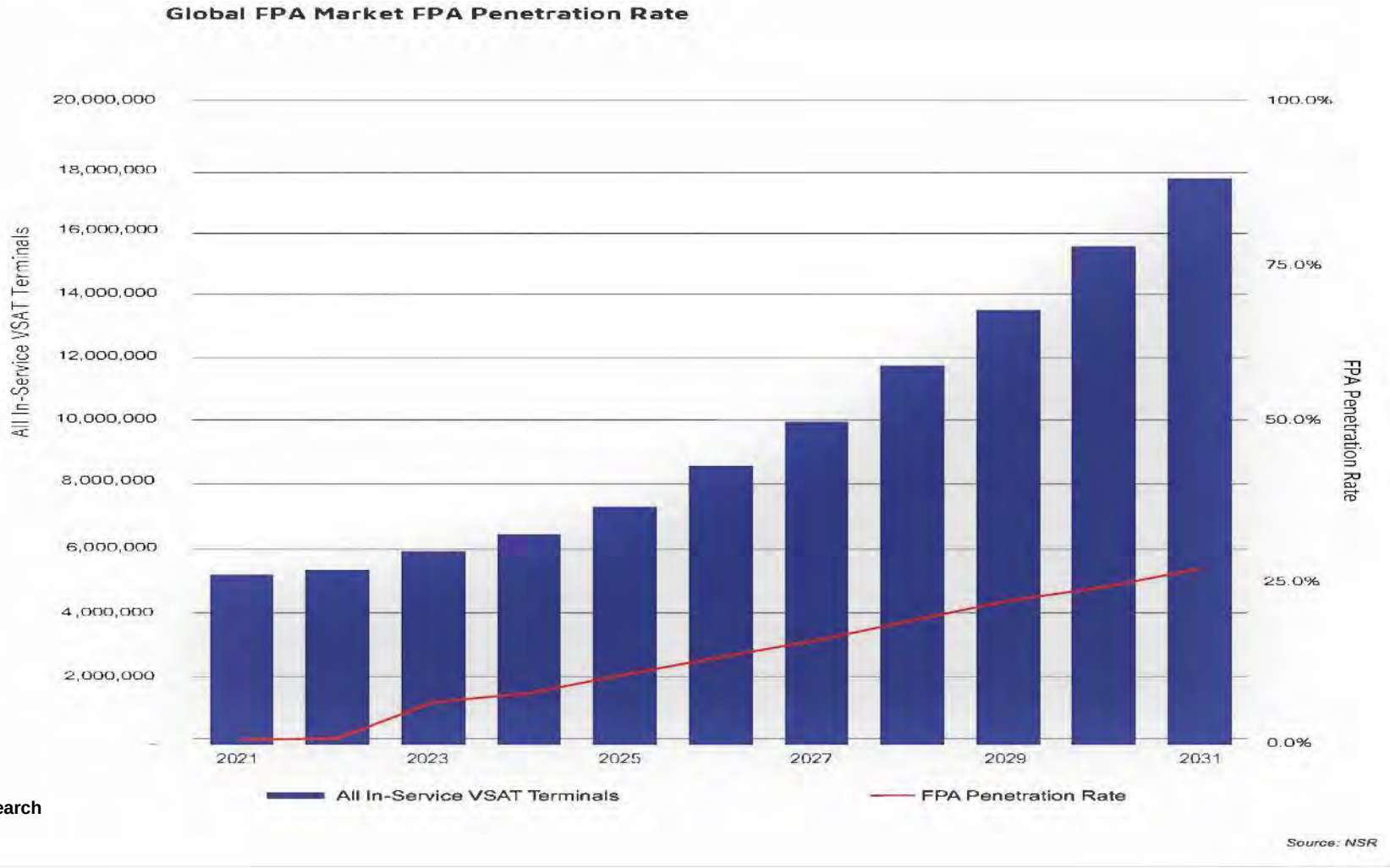


Flat Panel Antenna vs Parabolic Under Test

NSR’s Flat Panel Satellite Antenna Analysis

*** Credit by NSR - Northern Sky Research**

NSR’s Flat Panel Satellite Antenna Analysis



*** Credit by NSR - Northern Sky Research**

ESA Antenna

Supports GEO, LEO, MEO Constellations
Ka-band Frequency: Transmit: 27.5-30.0 GHz Receive: 17.7-20.2GHz
Electronic Beam Steering and Tracking
Elevation Angles: 20-90 deg; (70deg from Boresight) with scan loss up to 5dB
Azimuth Angles: 360 deg Continuous
Polarization: Software switchable, Linear (H/V) or CP (RH/LH)

Cars with ESA Antennas

High-Speed Trains with Phased Array Antennas

Simulation of Aircraft with Phased Array Antennas

Phased Array System for High Efficiency Millimeter Wave Wireless Communications of 37-48GHz

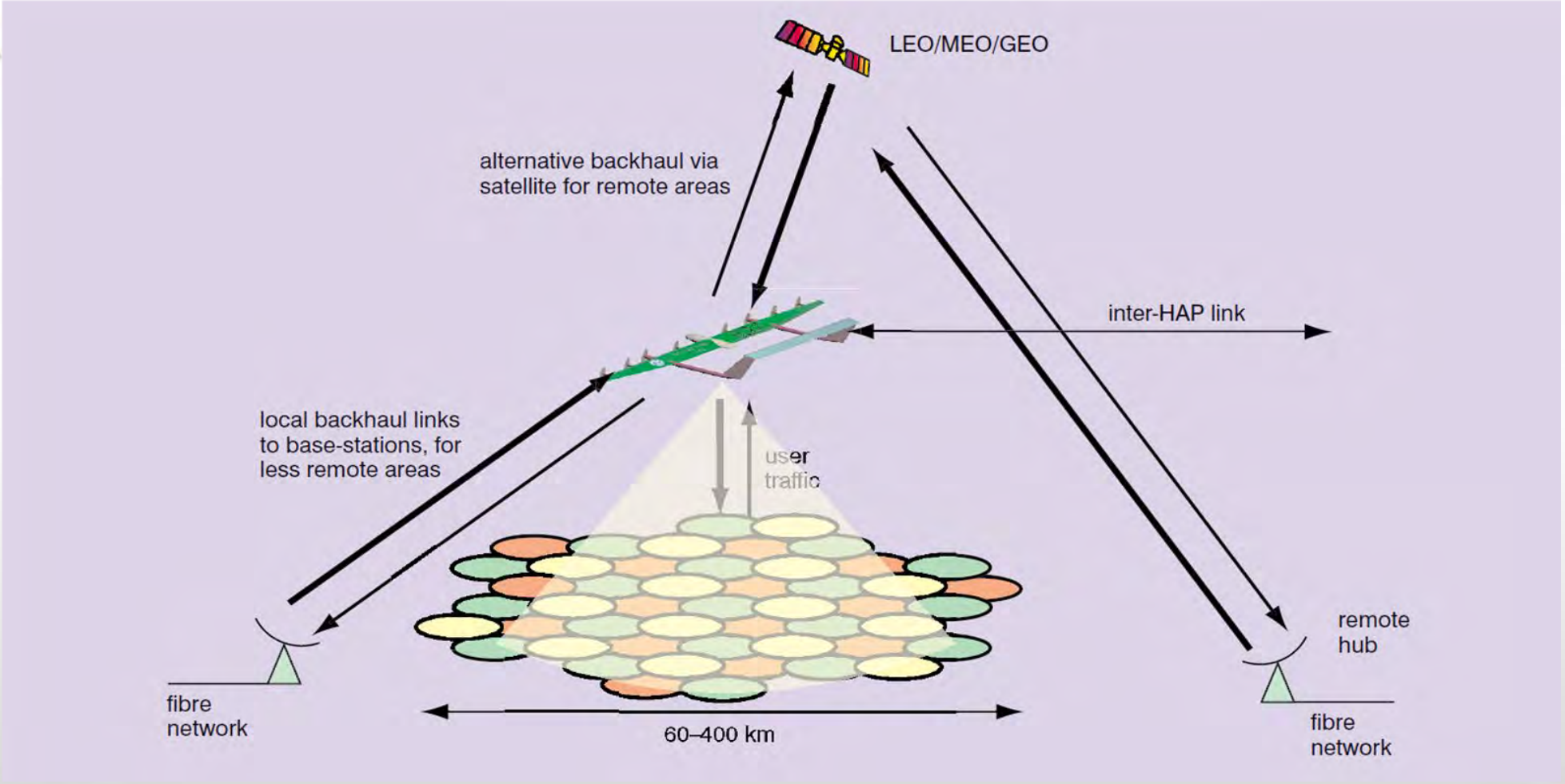
HEFPA 5G+

PARTNERS

C-COM Satellite Systems Inc.
Skyworks Solutions Canada Inc.
University of Waterloo
Eindhoven University of Technology
NXP Semiconductors
Semiconductor Ideas to the Market

COUNTRIES INVOLVED

Canada
Netherlands



Phased Array System for High Efficiency Millimeter Wave Wireless Communications of 37-48GHz

HEFPA 5G+

- 5G services currently being rolled out in Europe and elsewhere are based on updated 4G systems.
- A host of Low-Earth Orbit Satellite constellations are now in deployment that will leverage ubiquitous coverage between the north and south poles.
- The biggest gains will come from the introduction of new mmWave technologies, which use radio waves of much higher frequencies and shorter wavelengths.
- These technologies are the key to improved network capacity, faster downloads (anywhere from 10 to 100 times) and reductions of up to 10-fold in ‘latency’ (i.e. the time to respond to an instruction or a command).
- Softbank HAPS Mobile Mission Concept: https://www.hapsmobile.com/en/media/

Thank You!

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