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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**
Dividend yield: 3.91% (Q1, 2024)



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
- 41:** Models available of the iNetVu® auto-acquire, motorized antenna
- 10:** Modem manufacturers PLUG & PLAY Integrated with iNetVu® (35 different modem models)
- 12:** Sizes of antenna available (60cm, 74cm, 75cm, 80cm, 98cm, 1.0m, 1.2m, 1.3m, 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)
- \$25.6 million:** Working Capital (as of February, 2024)
- \$25 million:** Shareholder Dividends Paid (as of February, 2024)
- 48:** Consecutive Quarterly Dividends
- \$0:** Debt

Note: As of November, 2023. All figures in \$CAD



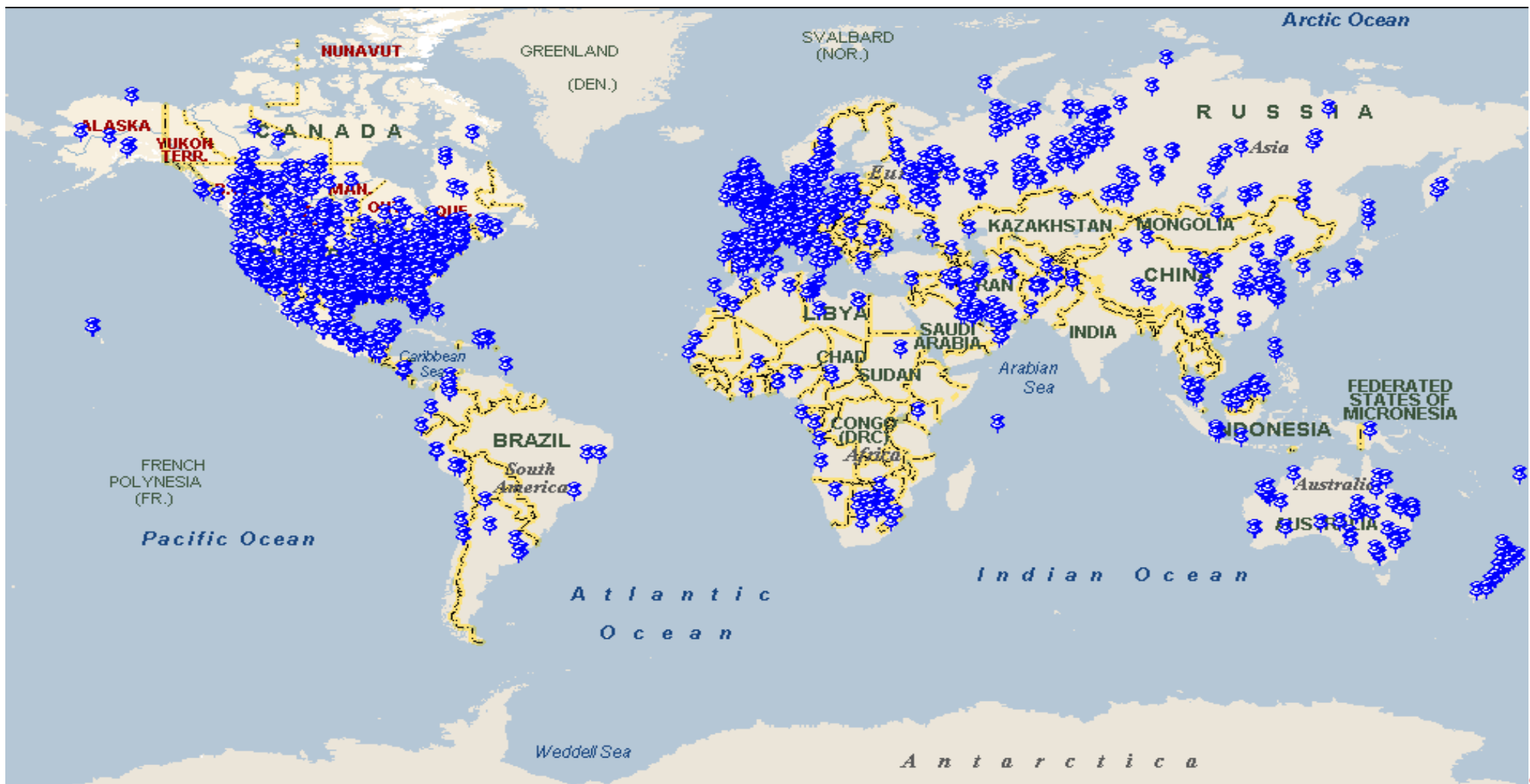
Commercial Markets Using Mobile SATCOM

- 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**, or **NON-EXISTENT**, Broadband Internet via Satellite is the **ONLY** option.

Worldwide Deployment



iNetVu® Platforms (75cm – 240cm)



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



FLY-74/G FLY-75V FLY-981 FLY-98G/V/H ACFLY-1200 FLY-1202 FLY-1202G/V FLY-1801 MP-60/80/100/130

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

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

Ka

NEW
GEN

iNetVu® Ka-74X



Ka-74G



- 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® 7715 Controller

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

Ka

NEW
GEN

iNetVu® Ka-98X

(G/V/H/H-JUP)



iNetVu® 7710 Controller



avanti Approved Compatibility



eutelsat
type approved for KA-SAT

ViaSat

avanti Approved Compatibility



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



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)

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

MP-60/80/100/130 - Manpack

- 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 for Film Production in British Columbia



Manpack Deployment in Japan following Typhoon 19





Oil & Gas



FracTech – Texas, USA - 1200



ITC Global - Australia - FLY-1201



Diverselt - 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
Altegosky – 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 Health - 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.

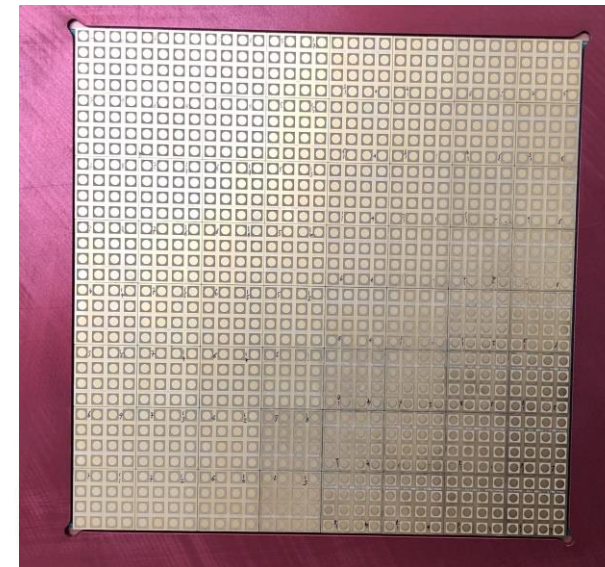
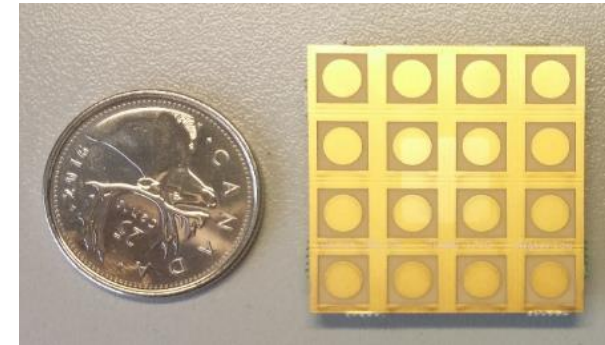
All of these grand schemes require antenna design expertise.

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.



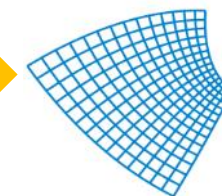
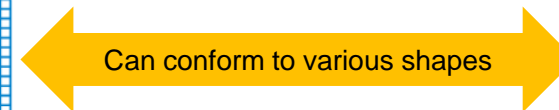
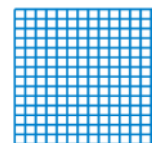
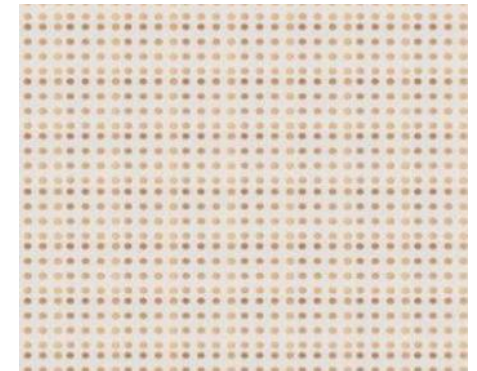
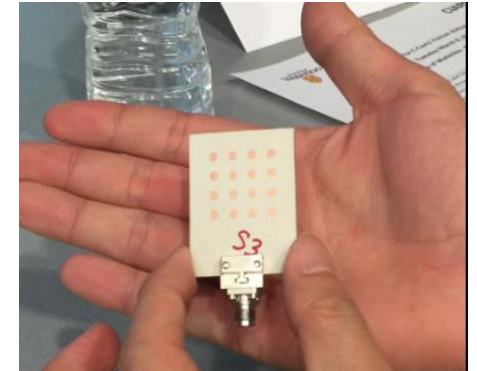
16x64 RX 4x4 Modules
(1024 Elements)

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



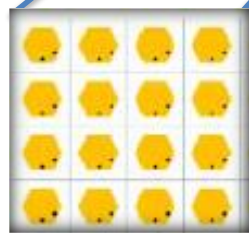
Scalable Architecture: 4x4 to 16x16 to 80x80 Antenna Sub-Arrays



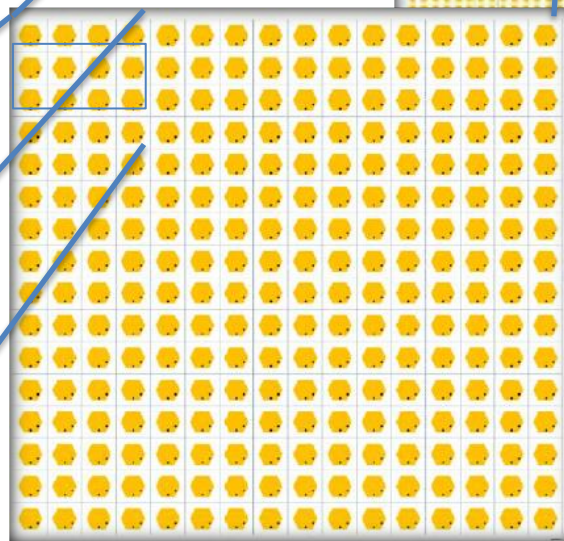
4 x 4 Antenna Sub-Array Module

4X4 Tile

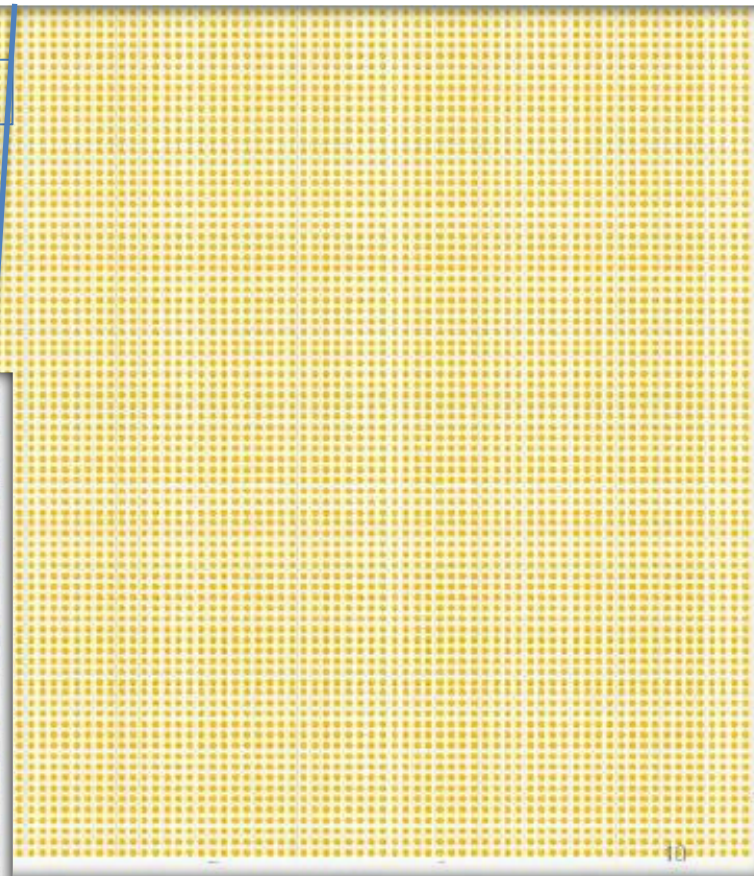
Microstrip-line
feed circuit
containing
variable gain
low noise
amplifier (LNA)
and the BST
phase shifter



**4x4 Sub-array
Module**



**16x16 Sub-array
Module**



80x80 Array Panel
made of 25 of 16x16 sub-arrays

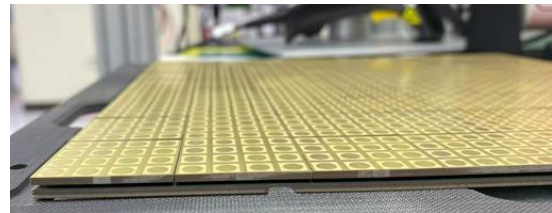
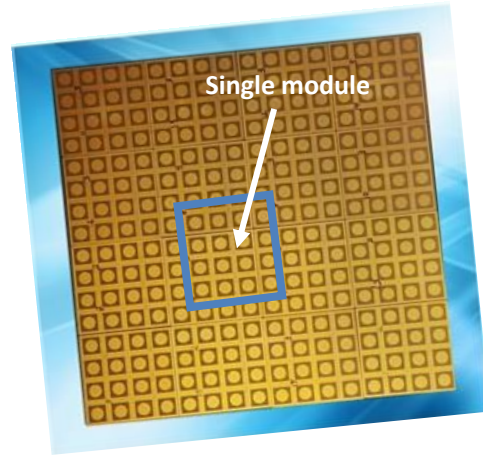
Flat Panel Antenna vs Parabolic Under Test



Satellite Ground Terminal (GEO, MEO,LEO)



Popular Mechanical Scanning Antenna

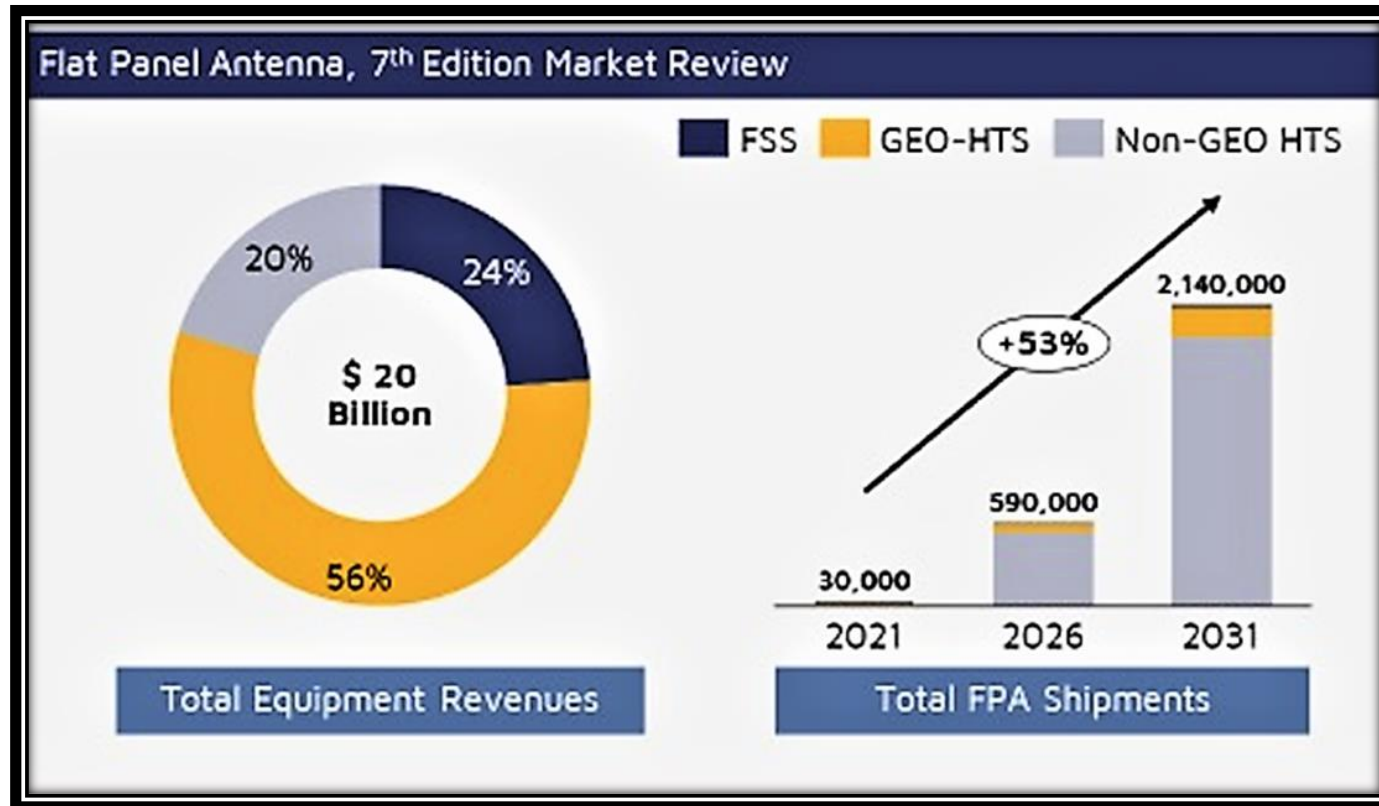


New Generation Antenna

**Flat Electronic Scanning Antenna
under Development by C-COM**



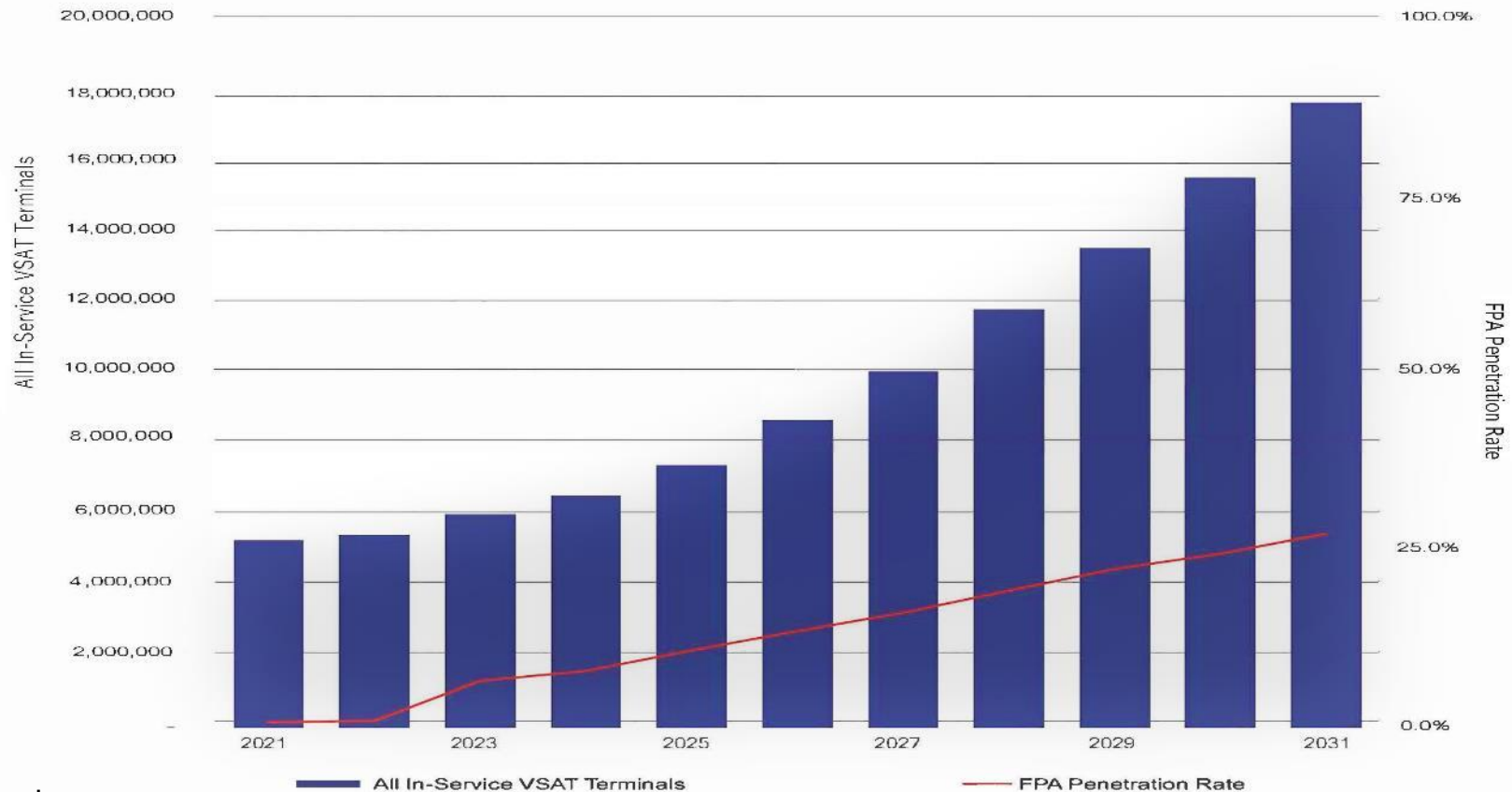
NSR's Flat Panel Satellite Antenna Analysis



* Credit by NSR - Northern Sky Research

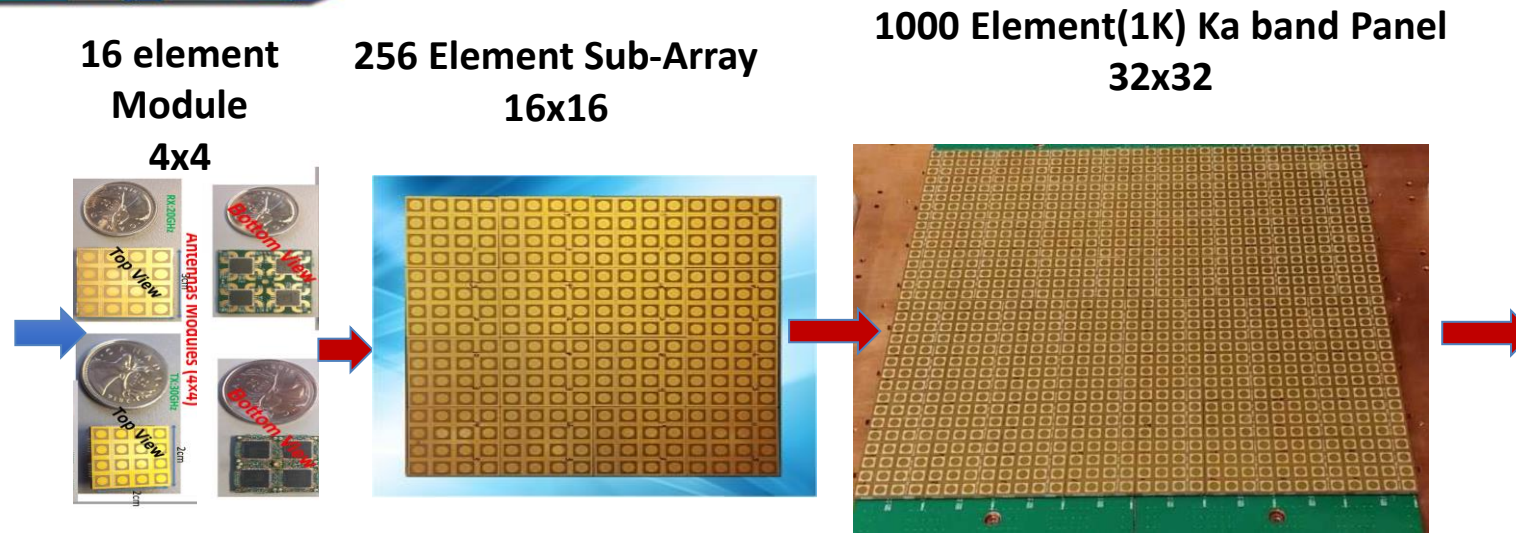
NSR's Flat Panel Market Penetration Rate

Global FPA Market FPA Penetration Rate



* Credit by NSR - Northern Sky Research

Modular and Scalable Flat Panel Ka Satcom Antennas in Development



iNetVu® iNmotion 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

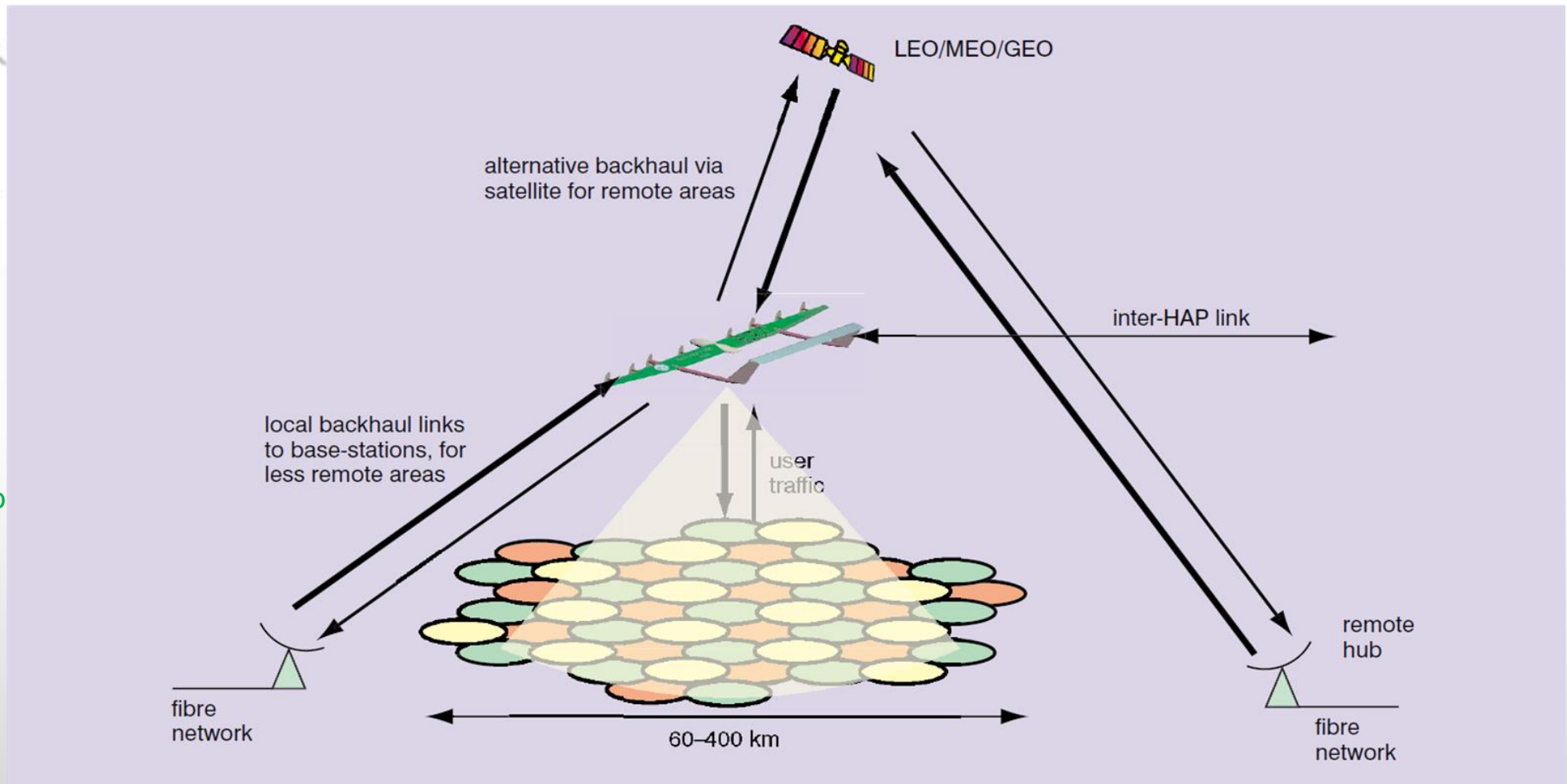


PARTNERS

- 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

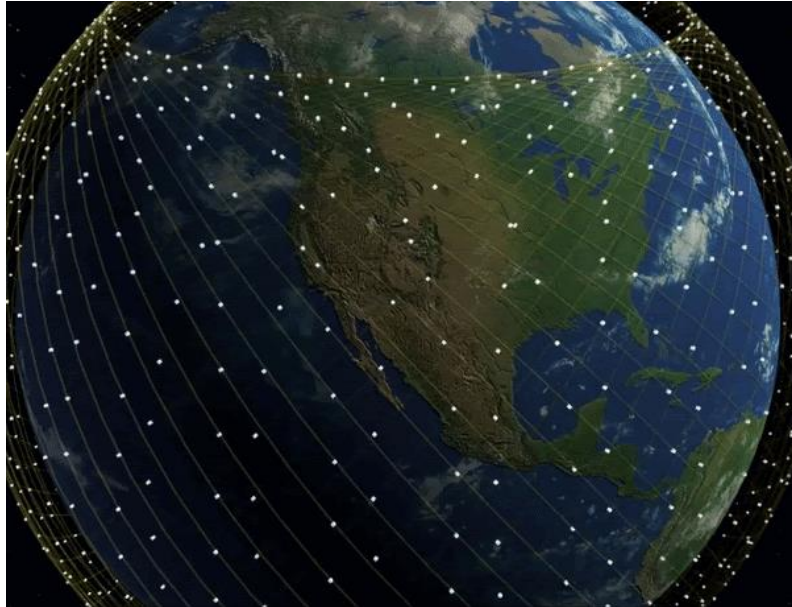


Phased Array System for High Efficiency Millimeter Wave Wireless Communications of 37-48GHz



- 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/>

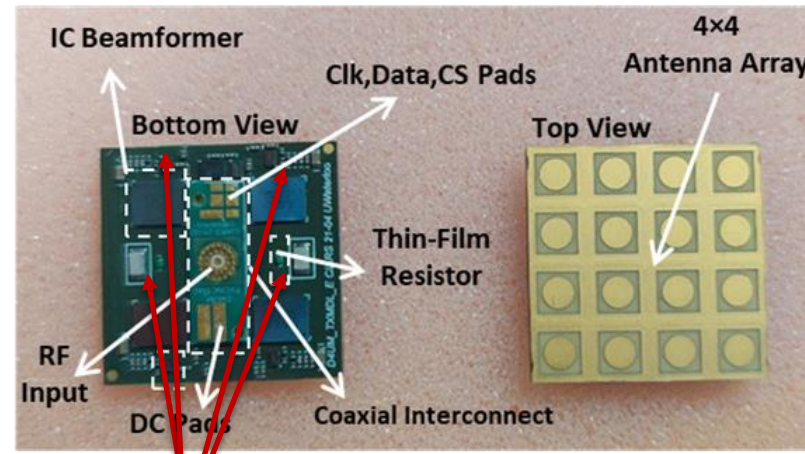
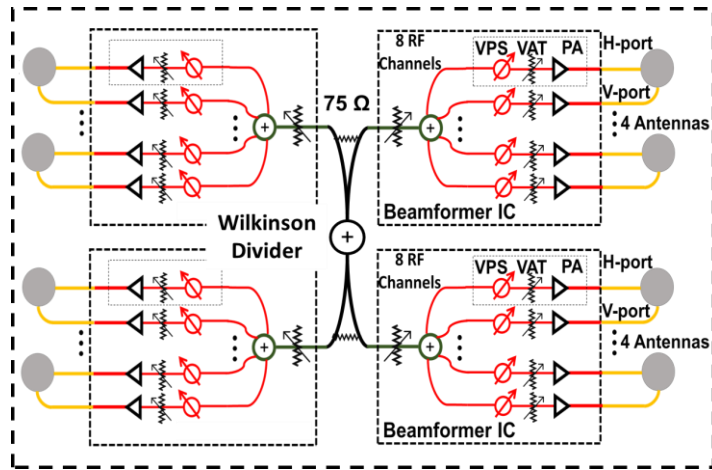
Emerging LEO/MEO Constellations and the growing need for Electronic Scanning Ground Terminals



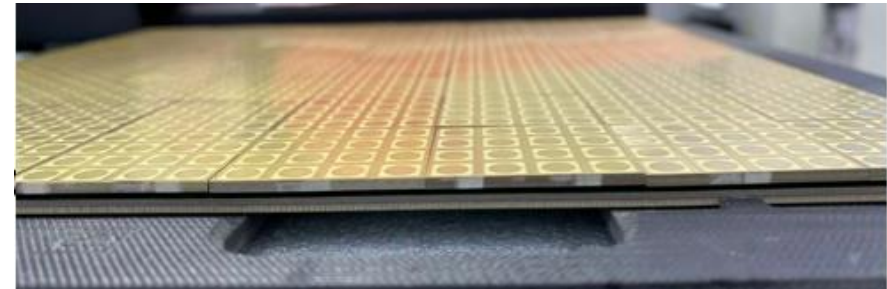
Canada TELESAT Lightspeed Constellation

Broadband LEO/MEO/GEO Satellite Connectivity on the Move

Integration of Silicon BFICs (a Key Component) into Antenna Modules



Multi-channel BFICs



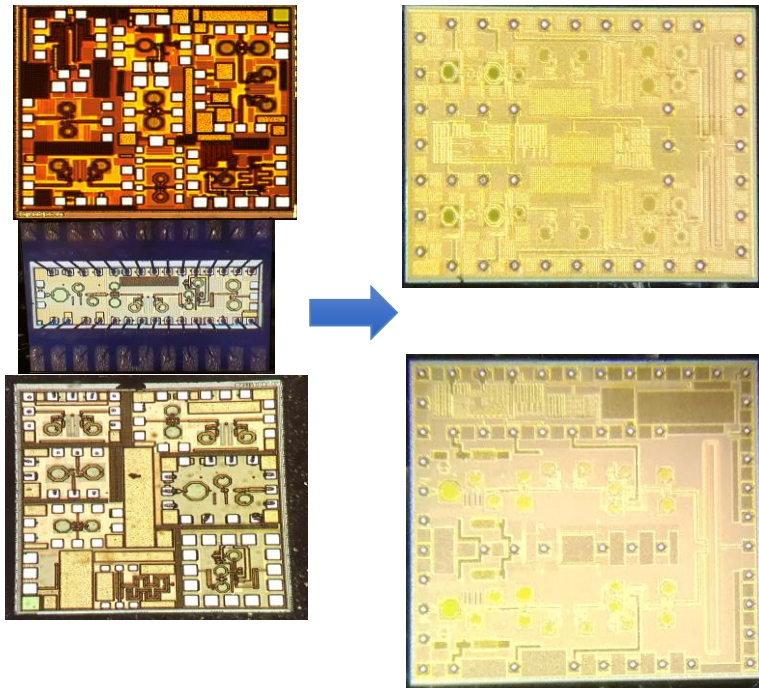
- ❑ TX frequency band : 27.50-31 GHz.
- ❑ RX Frequency band: 17.7-21.2GHz
- ❑ Programmable Polarization : LP (H/V) and CP (RH/LH).

C-COM Ka-band BFIC Evolution

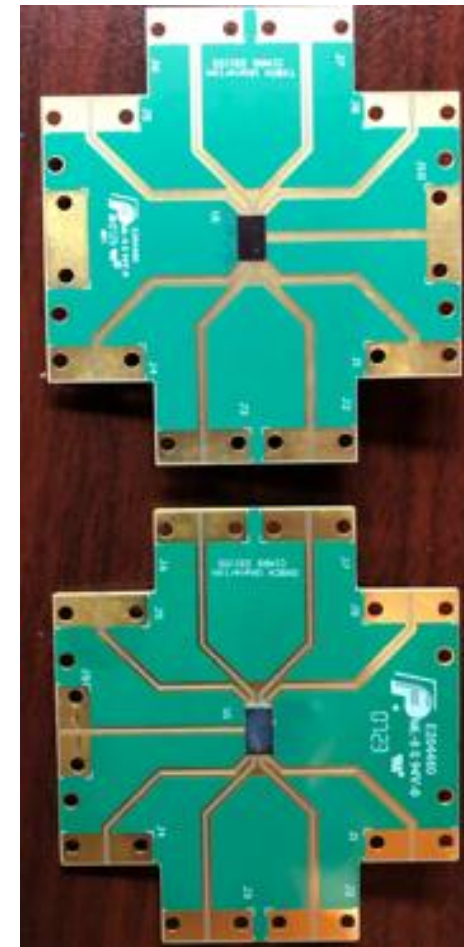
World's Highest Performance, Lowest Power Consumption Satcom BFIC

Significant research and engineering development in developing high performance

Custom Satellite Chip

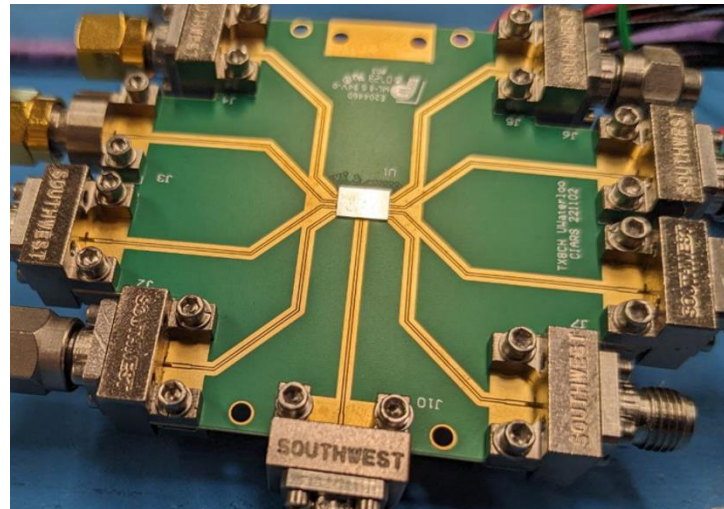
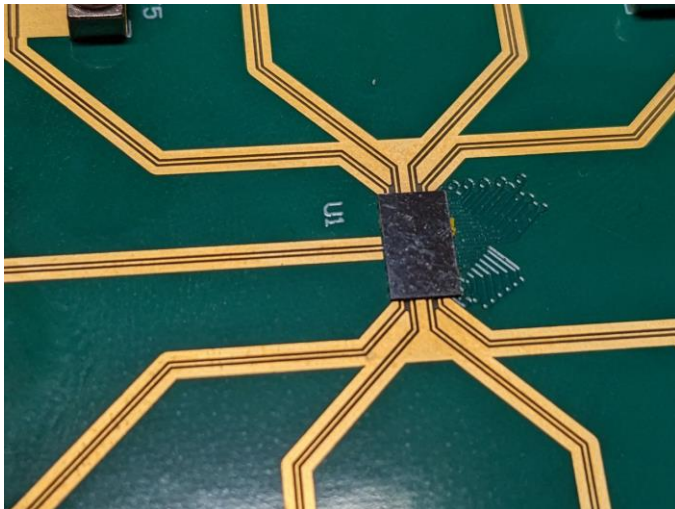
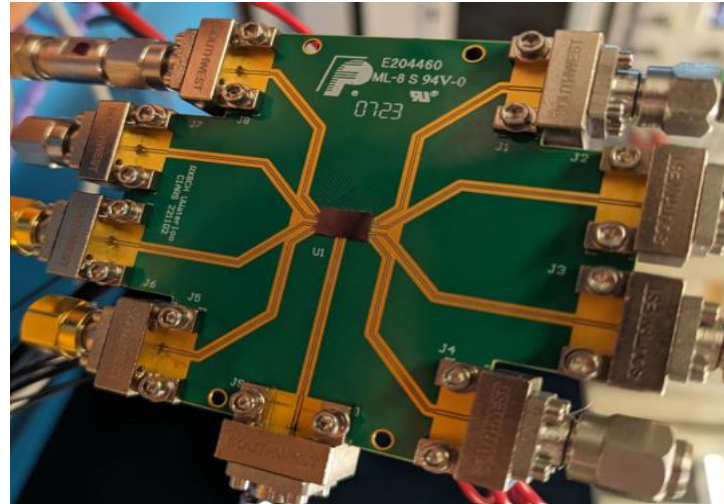
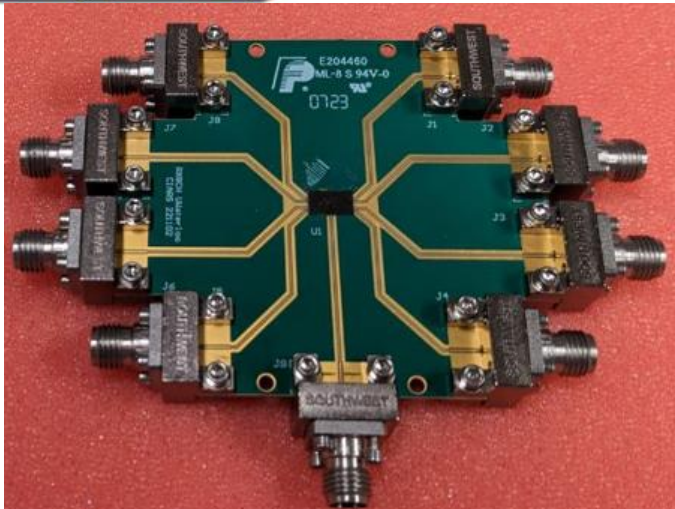


C-COM Multi-Channel Satcom BFIC



C-COM Ka-band BFIC in Development

World's Highest Performance, Lowest Power Consumption Satcom BFIC



Thank You!



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www.c-comsat.com