CIRCUITS INTEGRATED

Market Report
CIH – Kythrion IC

Shrinking complexity. Powering the next leap in space infrastructure.

PSW Paris Space Week LAUREATE

FARNBOROUGH INTERNATIONAL SPACE SHOW WINNERS START UP INNOVATION AWARD

EUROPEAN UNION EUROPEAN DEFENCE FUND

ΕΣΠΑ 2014-2020

EPIC EUROPEAN-SINGAPOREAN SPACE STARTUP COMPETITION 2024 Selected Winners

Horizon Europe 2021-2027

esa BUSINESS INCUBATION CENTRE

A Team that knows how to deliver

Dr. Paolo Fioravanti
CEO
(Pioneer 1st ever flight Operation Gilat-ESA)

Dr. Giannis Kontogiannopoulos
CTO
(Pioneer Starlink Antenna development)

Mr. Carl McMahon
CCO
(3 successful M&A < $100M)

- Team of 20 : 18 Engineers
- 200+ Years engineering experience

- 16 Customer Contracts YTD
- 3 Satcom Engagements
- 4 LOI´s

- Since 2020 – Rev €6M
- Rev 2025 – FCST€2.4M
- EBITA 2025 - FCST €0.65M

At CIH, we standardize miniaturization, delivering efficient, scalable RFIC solutions, transforming the future of satellite communications.

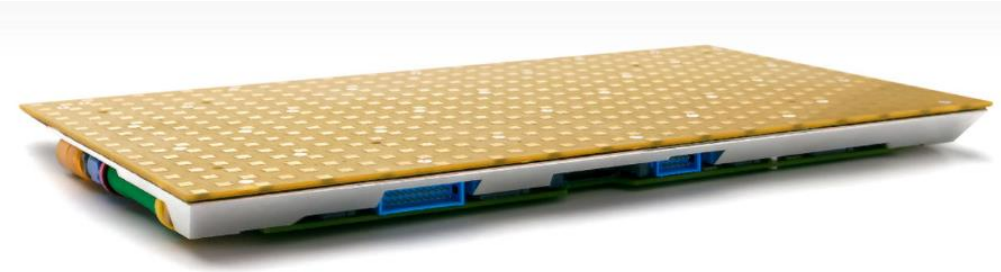
Part and Active R&D

Project	Description	Consortia's Partners
3D-TOPOS GR NATIONAL	3DIC for beamforming systems. Ka and Ku, phase shifters in silicon PDK in GaN and WLCSP HPA in GaAs	
AGAMI-EURIGAMI EDF	EU Supply chain for Gallium Nitride (GaN). HPA and GaN digital design with E/D-mode HEMTs	
POWERFLEX EDF	High power and frequency conformal Flexible GaN power amplifiers SPI digital control of integrated circuitry	
POWERPACK EDF	3D heterogeneous SiP integration HPA and the LNA design Package modelling	
NANOMAT HORIZON EUROPE	2.5D / 3D SiP/AiP Flexible electronics HPA while supporting the PDK development for FORTH.	
ESA BIC	CIH incubation Dual output PA module Record area and cost reductions Patent Pending	

EU Leading edge 3D Compound-Semi since company inception

WHAT IS AN ACTIVE FLAT PHASED ARRAY?

Electronically controlled beam steering at the element level



Phasor antenna

Phasor

Complex Composite Antenna

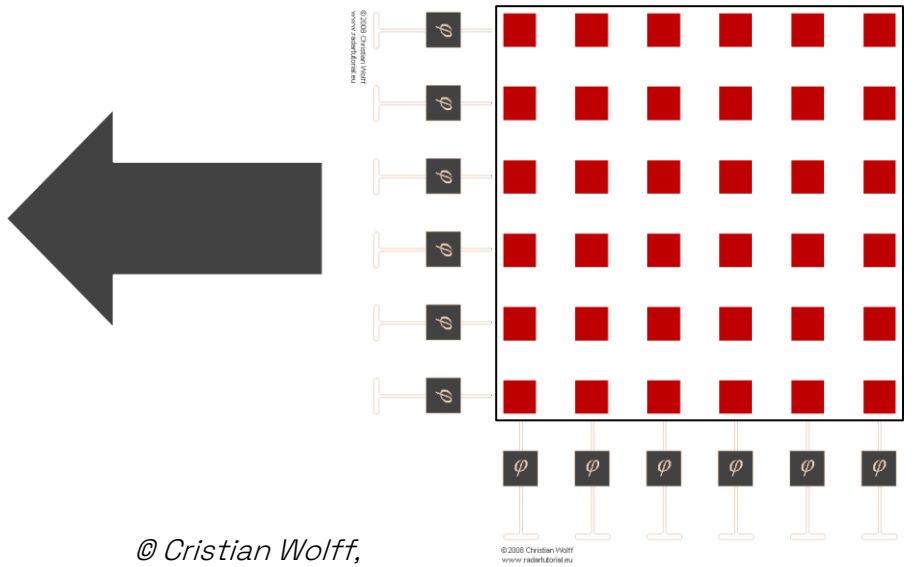
Enable Links Between Moving “Targets”

Control Of Signal Direction

No Moving Parts

Delay Among Antenna Elements

** AESA – Active Electrically Scanned Array*



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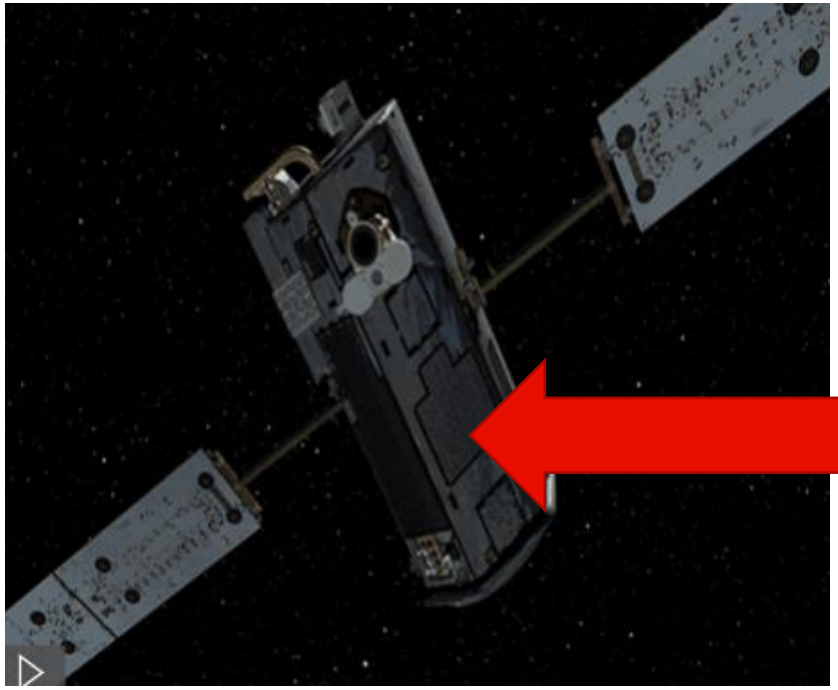
FPA – SATCOM and EO Deployement

STARLINK – Multiple FPA on one satellite



Sample of an FPA Antenna mounted on an EO Satellite

Square Panel in mid-section of the spacecraft

STRATEGIC SHIFT TO FPA

Flat panels are the cornerstone of future connectivity beyond pure Satcom

UAVS / DRONES

CONNECTIVITY

SATCOM ON THE MOVE

DEFENSE TERMINALS

Market Size:

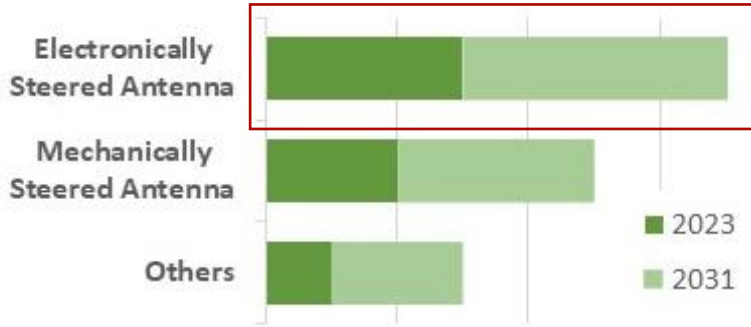
US$ 7.47 Bn (2023)

CAGR (2024-2031)

US$ 20.89 (14%)

2031

By Steering Mechanism :



Market US$7B – FY31

AESA/FPA becomes the dominant for of Antenna for next-gen communications

CURRENT STATE OF THE ART

Why Current FPAs Aren't Enough

Legacy 2D design

Silicon technologies on PCB

PAIN POINTS

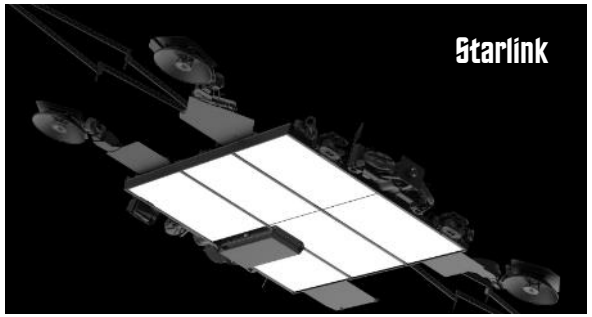
Heavy Panels (Up to 30KG)

Hundreds of components

Large Form Factor

Expensive

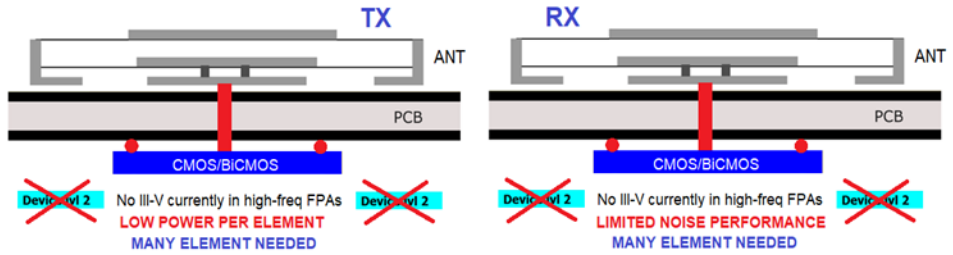
Complex PCB required



FPA Space Deployed

FPA Terrestrial Deployed

Current 2D FPA approaches

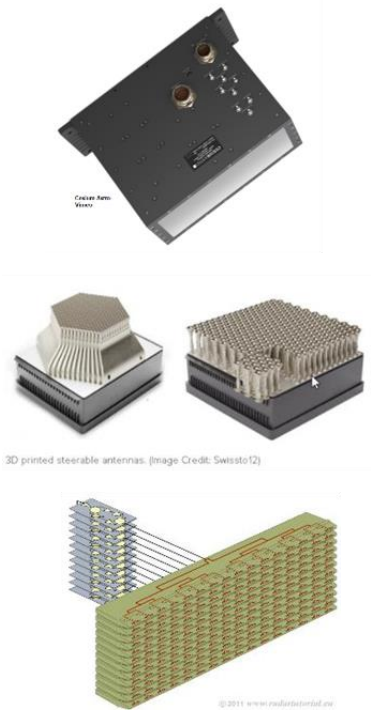


TX, RX and ANT are separated
Legacy Silicon Application

Shrinking a Phased Array Antenna –TX example

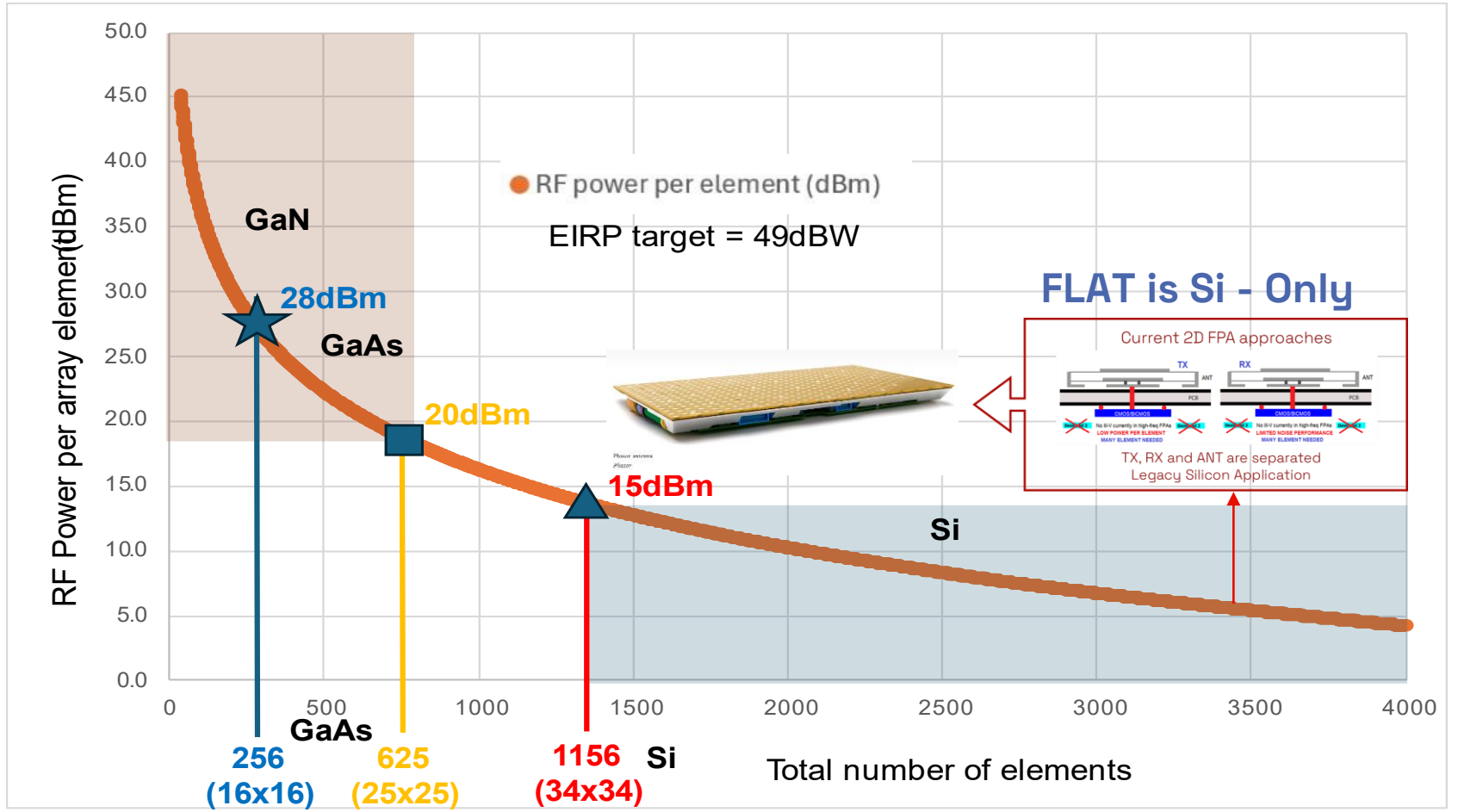
Trade-offs : Power per element/Array size

SWaP-C unfriendly



NON FLATIII-V (+Si)

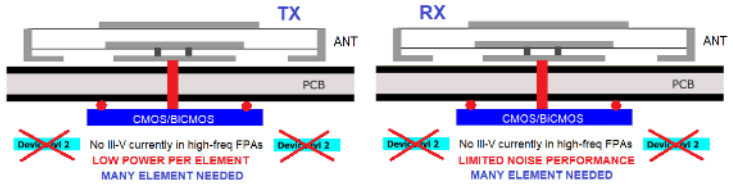
(tiled AESA)



Current art is either flat/large Si or bulky/heavy III–V

KYTHRION™: ACHIEVING MORE WITH LESS

Current FPA approaches



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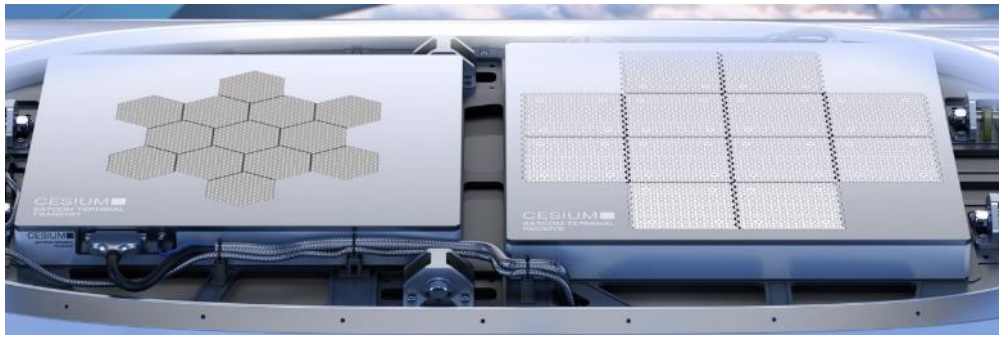
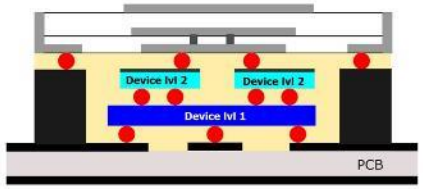


Kythrion™

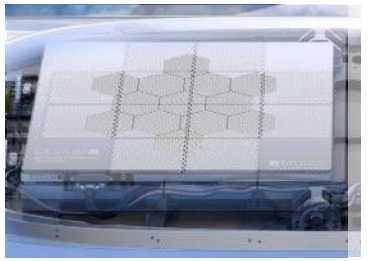
3D Integration



Combines TX/RX/ANT
Innovates Silicon and III-V

Lower Costs

Reduced Size

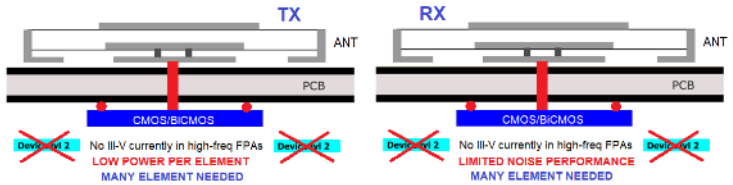


RX & RX Under the One Appeture

Kythrion™ antenna chip (5x pat. pend) provides 60% full SWaP-C

KYTHRION™: Dual Use Application

Current FPA approaches



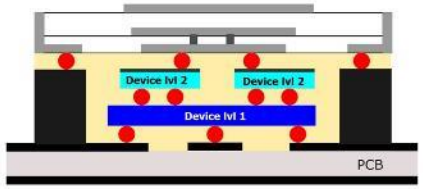
TX, RX and ANT are separated
Legacy Silicon Application

Actual
23Kg

1.4m x .5M

Kythrion™

3D
Integration



Combines TX/RX/ANT
Innovates Silicon and III-V

Lower
Costs

Reduced
Size

Estimate
7Kg

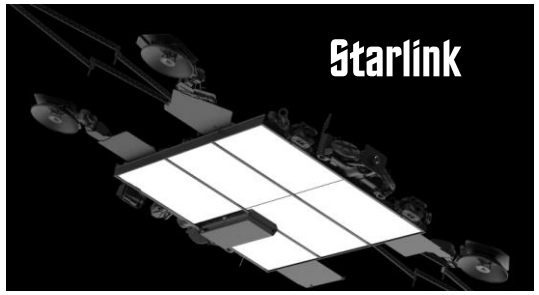
.5m x .4M

RX & RX Under the One Appeture

Reqtech – RESA M Ka size comparison built from Kythrion

Direct ROI with Kythrion – Lowering Barriers to Entry

Legacy antenna accounts for 13% to 20% of the total satellite weight



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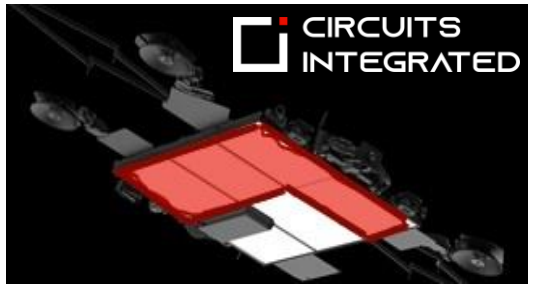


- 100 Satellite cluster - Savings $20M+ per launch
- 20% lifetime extension due to weight reduction
- Capability to deploy more Sats in one launch
- Enabling increased scope – Maximizing Viability
- Cost/Bit increasing Gb to Tb (X-Band to Ka-Band)

Satellites deploying Kythrion™ = Lower $$, Increase Lifetime / Mission Scope

FPA GROWTH: TRANSFORMING THE INDUSTRY

Satellite Demand

- Lower cost to launch drives exponential FPA growth.

Market Shifts

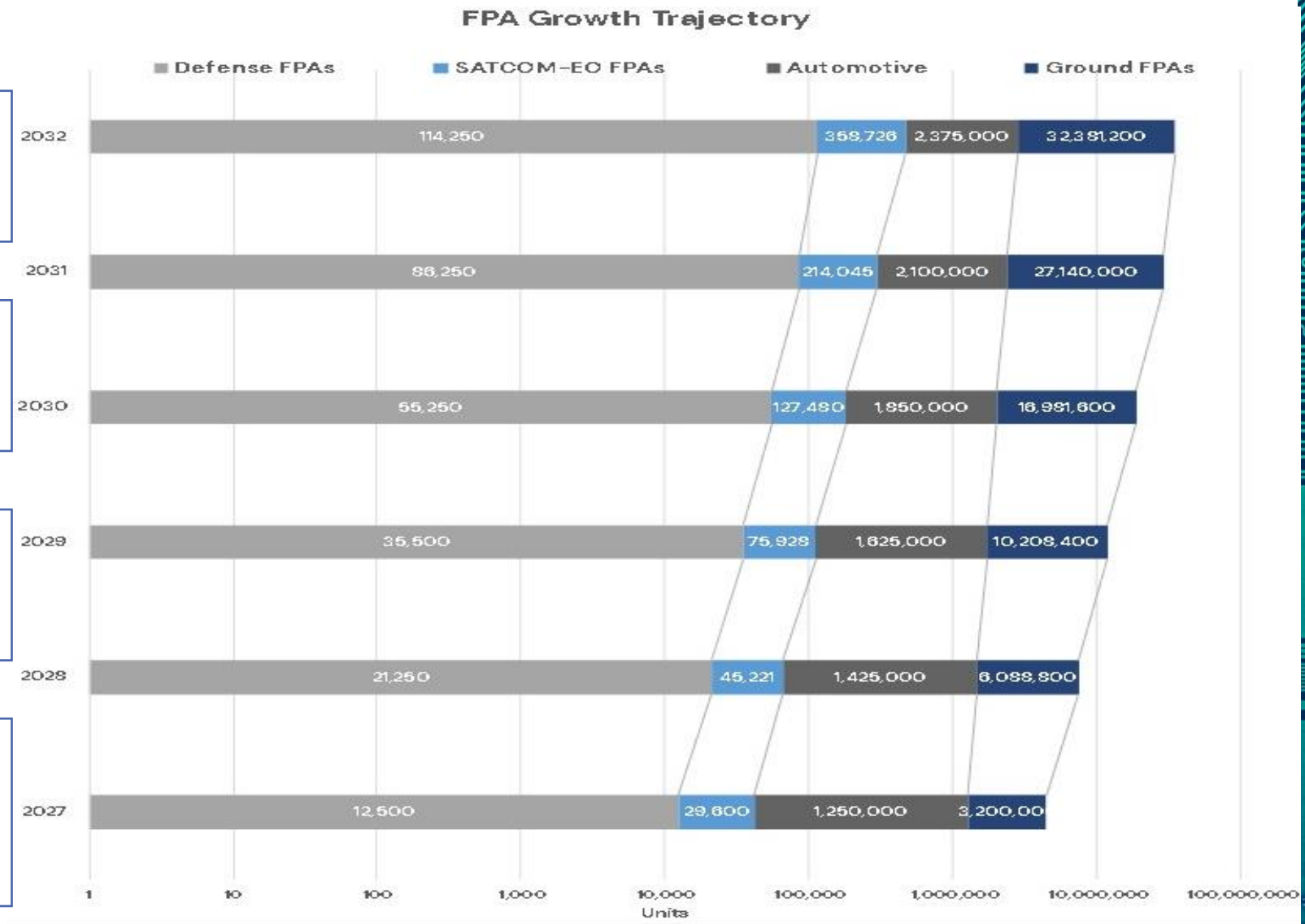
- FPA incumbent over traditional Antenna technology .

Multi-Sector Adoption

- Multimarket adoption across Space, Ground and SOTM

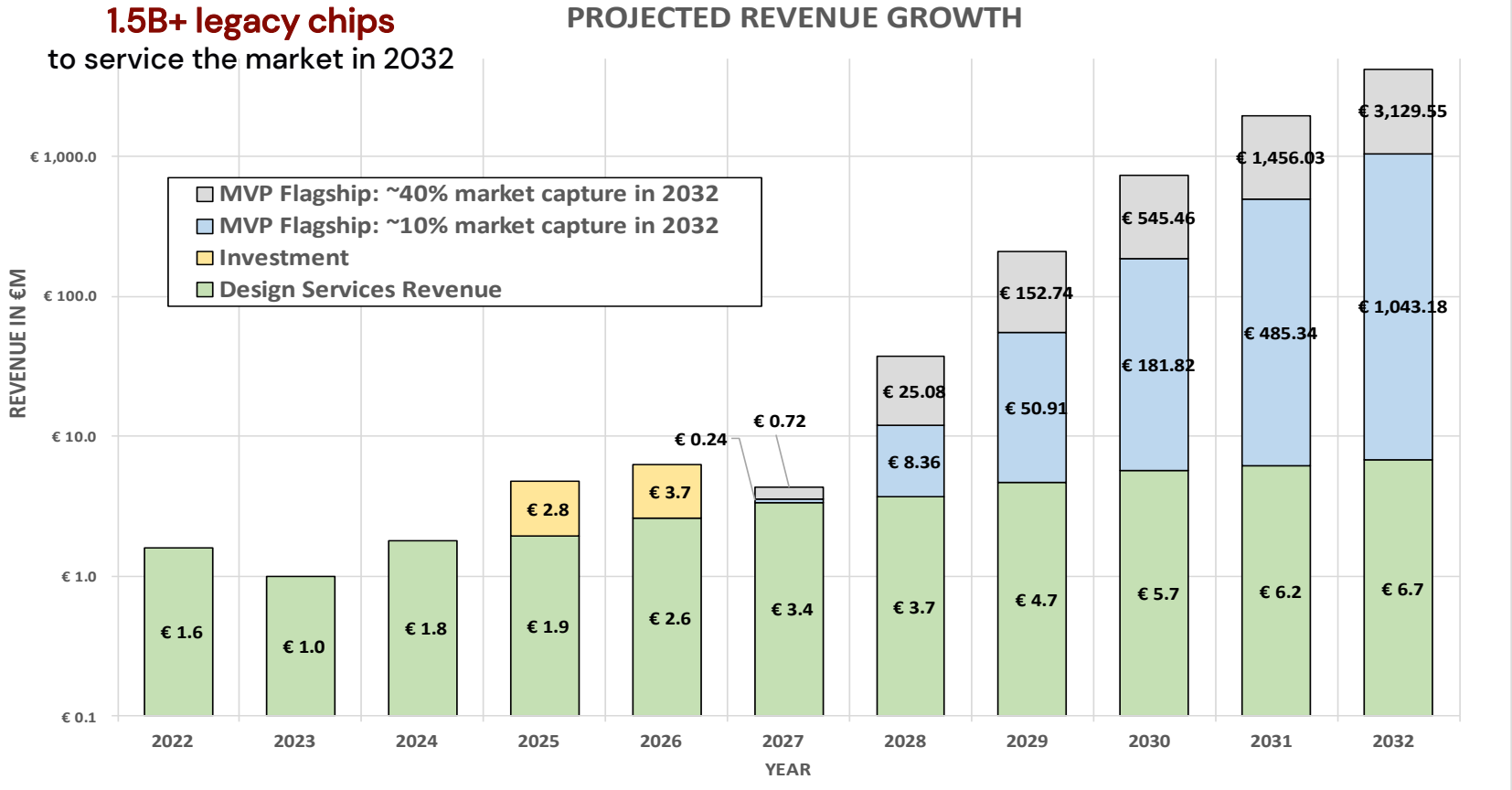
CIH New Market Enabled – Automotive

- CIH Chip Technology enables FPA adoption for Automotive Sector – 10M additional FPA



Commercialization Opportunity: Kythrion™

1.5B+ legacy chips
to service the market in 2032



5Y Market Refresh Rate
Atmospheric Drag leads to decommission of satellites

Space

Mobility

Connectivity

Defense

LEO satellites hockey stick is starting NOW – Large market for space alone

Satcom Consumer Market to 2032

GLOBAL LANDSCAPE

Limited Chip Suppliers

Established Customer Base

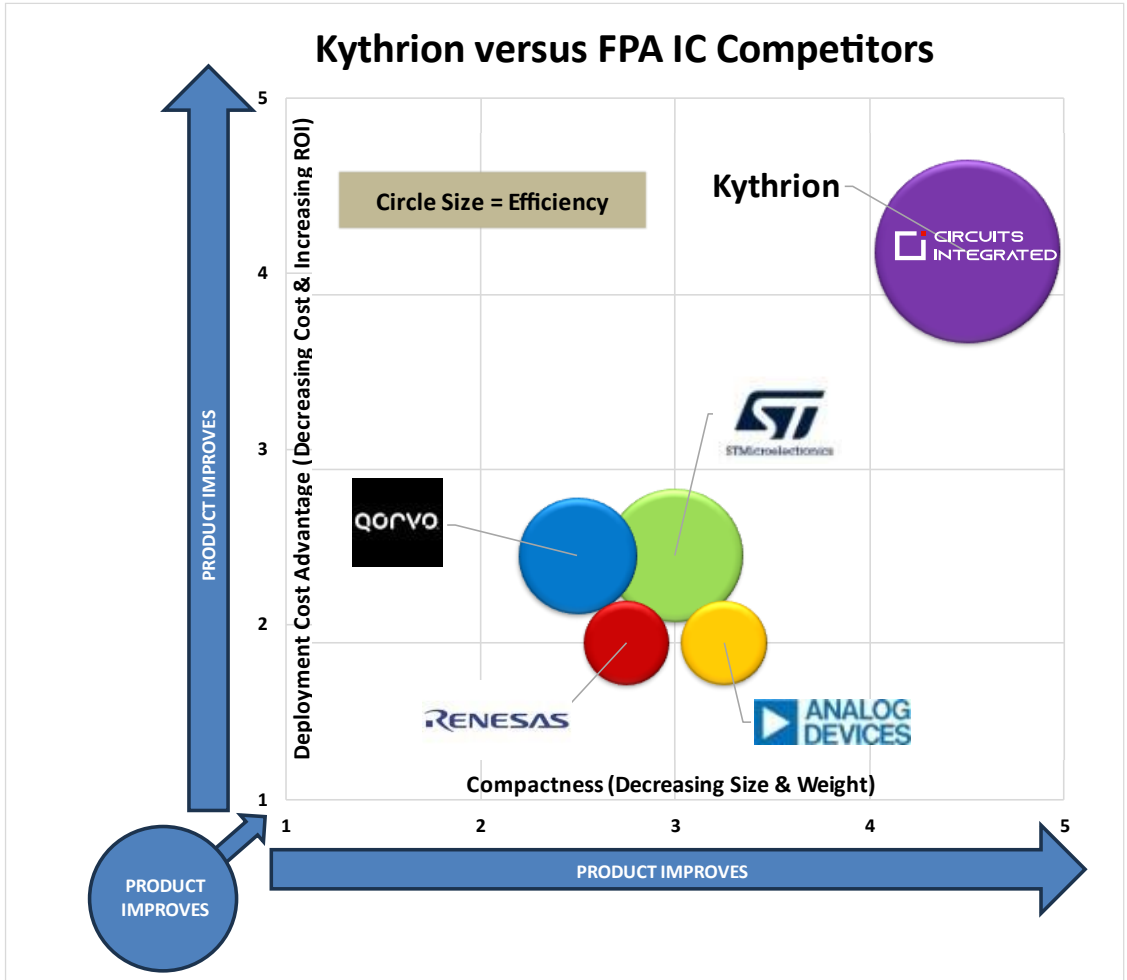
Rapidly Expanding Satcom Sector

FCST $9.5B FPA Market

FCST $33B Market

FCST $1.2T+

Kythrion™ vs. Competitors: A Game Changer



Advanced 3D IC Stack

- Versus all other competitors planar RFICs, CIH's III-V & silicon stack reduces size/weight 60%

Lighter Weight

- CIH's package-level integration cuts PCB reliance, making it 70%+ lighter than STM's technology

Superior Power Efficiency

- Consumes 20% less power than the Renesas solution by optimizing III-V and silicon integration.

Lower Manufacturing Cost

- Fewer components make CIH 20%+ cheaper than all other competitors

Outpacing the competition

- 4000 Hours of development tme over 3 years
- High barrier to entry for rival technology

Winning the SWaP-C Race: Best Performance, Highest ROI

KYTHRION: Sustainable Technology

Smaller, Lighter, Greener

- Reduces size and weight by over 60%
- Cuts launch emissions and minimizes material usage

Energy-Efficient by Design

- Delivers 15% lower power consumption, reducing satellite thermal load
- Extends mission life and lowers orbital carbon footprint.

Eco-Conscious Integration

- Combines III-V and silicon in a compact 3D system-in-package
- Modular: Streamlines assembly, reduces waste

Scalable for Smart Constellations

- Supports shared apertures and beam agility
- Enables denser, more efficient implementations with smaller satellites

Expands Access, Minimizes Impact

- Drives affordable connectivity for underserved regions while supporting responsible deorbiting and debris mitigation strategies.

KEY IMPROVEMENTS

- Over 60% smaller footprint
- Over 60% less weight
- Over 60% lower cost

APPLICATIONS

- Satellite broadband
- 5G infrastructure
- IoT networks
- Defense & aviation systems