Groundhog

Groundhog Inc.

for QIC CEO Week

October 2022

- **Company Introduction**

- **Products**

- **Financials**

- **Market Trend**

- **Company Introduction**

- **Products**

- **Financials**

- **Market Trend**

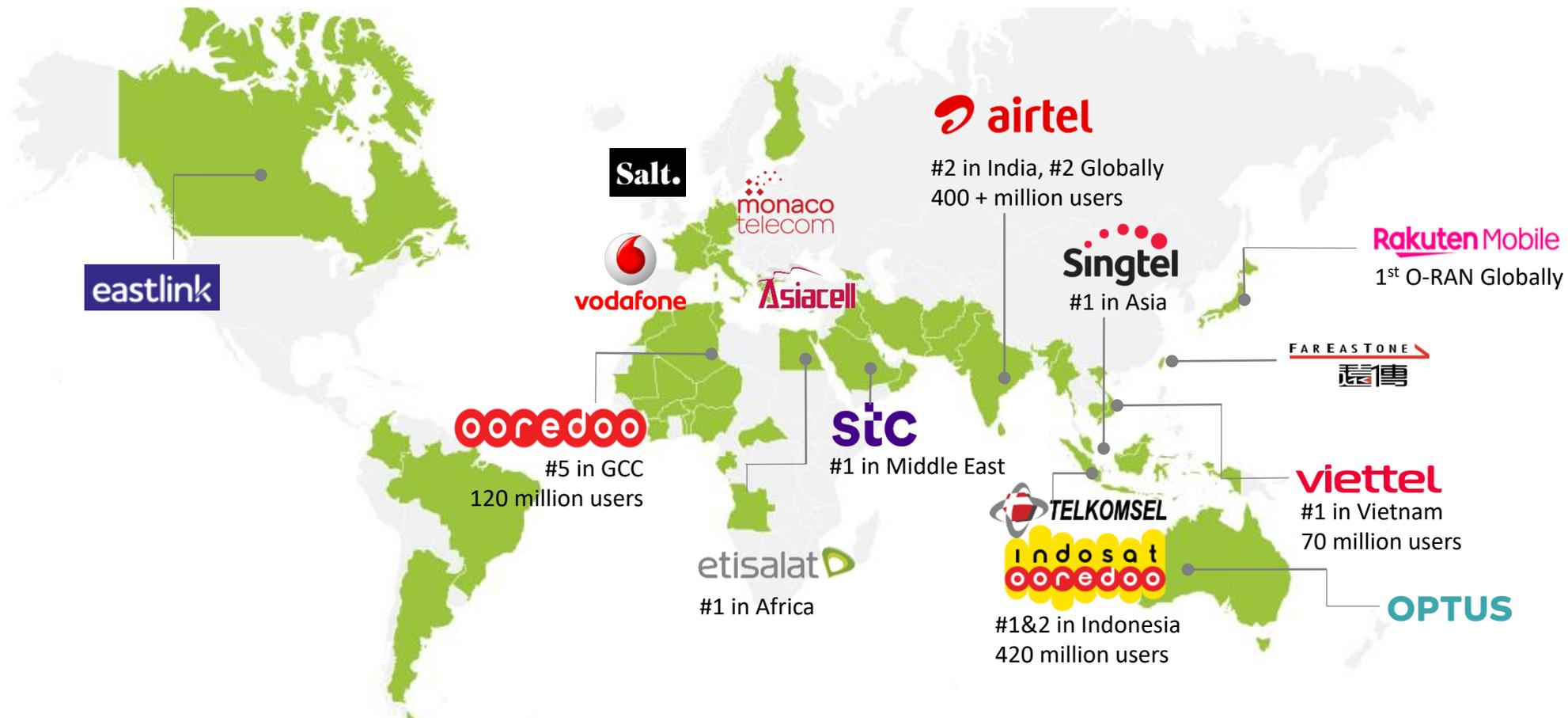# Top Player with Extremely High Entry Barrier

- **MIT spin-off with top scientists. Founded in 2001.**

- **First mover and major player in Geo-location niche market. 40 patents awarded. 30% market share.**

- **O-RAN Alliance Contributor since 2019.**

- **Awarded as Best Network Operations - Network Management Solution at Telco AI Summit. Featured as a top product utilizing AI & data analytics in telecom field by Analysys Mason.**

Groundhog Global Presence

Global customers across Asia, EMEA, and America.

Analyzing 1 Billion+ subscribers big data.

eastlink

Salt.

monaco telecom

vodafone

Asiacell

airtel
#2 in India, #2 Globally
400 + million users

Singtel
#1 in Asia

Rakuten Mobile
1st O-RAN Globally

FAR EASTONE
遠傳

ooredoo
#5 in GCC
120 million users

stc
#1 in Middle East

viettel
#1 in Vietnam
70 million users

TELKOMSEL

etisalat
#1 in Africa

indosat ooredoo
#1&2 in Indonesia
420 million users

OPTUS

Groundhog Executives

David Chiou, CEO
> MS, MIT Media Lab.
> Merrill Lynch Fellow.
> AT&T Labs-Research RA. Founding advisor of Skysoft.

Philip Young, CTO
> MS CS, Rutgers Univ. Data Mining Lab. BS EIS, Cambridge University.
> Technical lead, PacketStream.
> Researcher at Bell Labs.

Beong Lin, VP Sales for Strategic Accounts
> AT&T and other EMEA accounts.
> Past experience in BenQ Europe, TwinMOS, etc.

Kuan Chang, VP of Business Development
> MSc in Strategic Product Design TU Delft, BS NTU ME.
> Founding member of eSOON (acquired by China Intelligent Transport Systems).
> Co-founder of Skysoft (KKbox), which was acquired by KDDI.

Shaun Chang, VP, Mobility Intelligence
> MBA, NTU IM Network Optimization Lab.
> External consultant of Interwoven(acquired by HP) CMS product line.

From Big Data to Intelligence

Mobility and user behavior decides signaling, traffic dynamics, and bottlenecks in network and big data processing.

Location

› 24x7
› Latitude, longitude
› Up to 50x50m accuracy thanks to key IP.

QoE

› Drop Rate
› Throughput
› Volume
› RF conditions
› etc.

Context

› Moving
› Speed
› Direction
› Indoor / Outdoor
› POI
› etc.

Life Style

› User Mobility Pattern Profile
› Sticky Locations
› Commute Distance
› Deterministic Location Prediction
› etc.

Mobility Intelligence is a key to monetize mobile big data.

- **Company Introduction**

- **Products**

- **Financials**

- **Market Trend**

Groundhog Products

CovMo™

for accurate network planning and optimization

Mobility Intelligence™

for advertising & market strategy

RealMotion™

for public safety

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# Groundhog Products - CovMo™

CovMo™

for accurate network planning and optimization

- **Enhancing subscriber experience**: pinpoints subscribers' locations 24x7 for improving network quality, enhancing subscriber experience, and reducing churn, with automatic root cause analysis and optimization features.

- **Significantly increasing cost efficiency for operators**: efficiently increases ROI and saves drive test cost of USD millions every year for operators, with #1 geolocation accuracy.

- **Efficient 5G deployment**: helps surgical deployment planning of 5G and new applications.

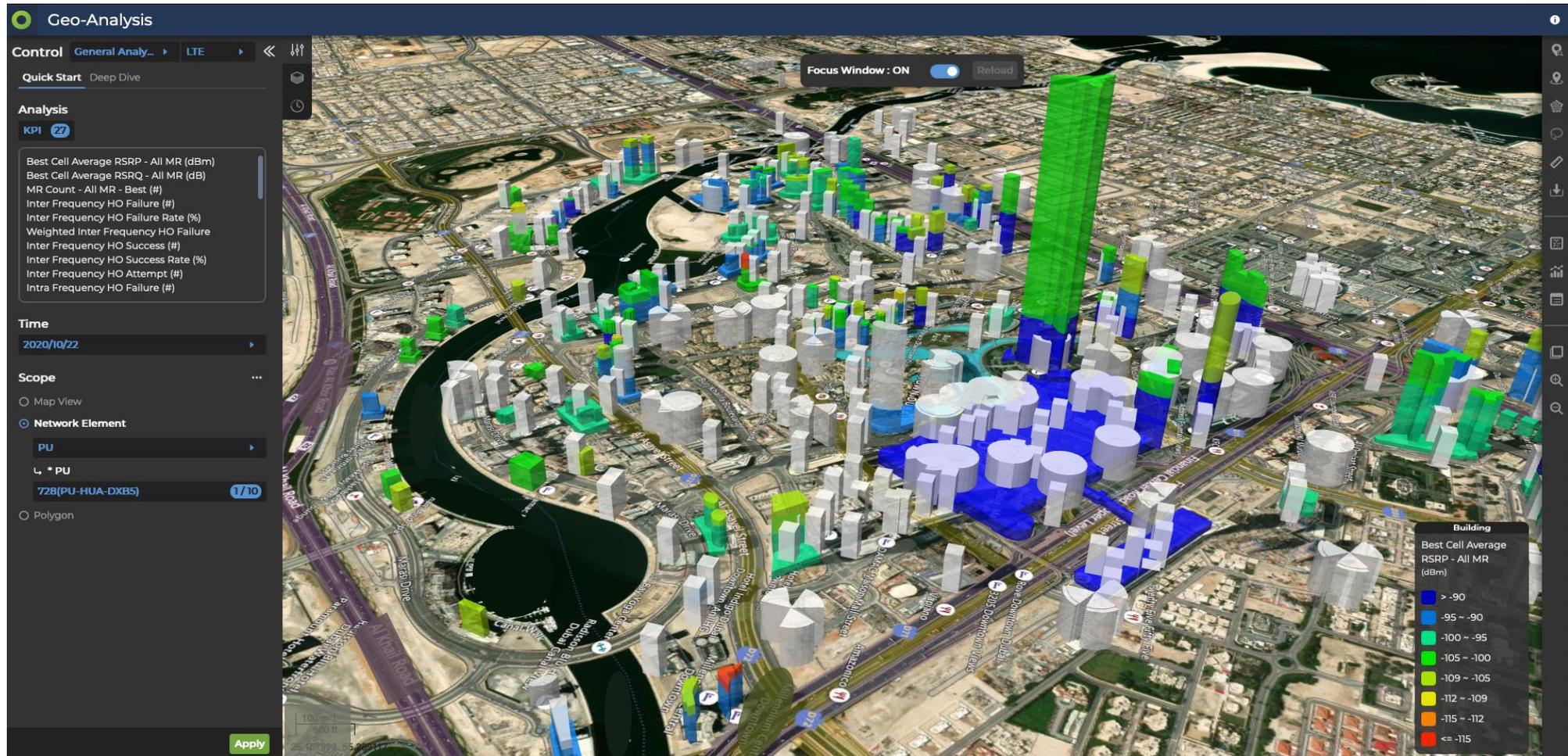*Nation-wide, 24x7, frequent geolocation & measurement of all subscribers.*

CovMo Demo (1/2)
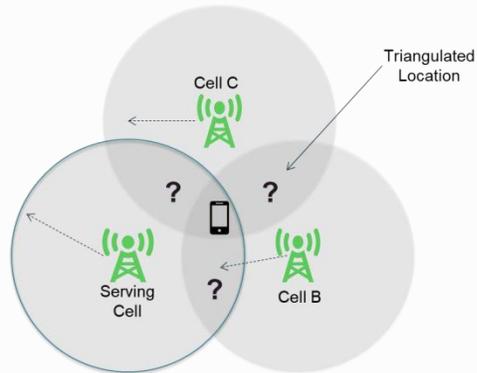
Revealing Live KPI Geographically
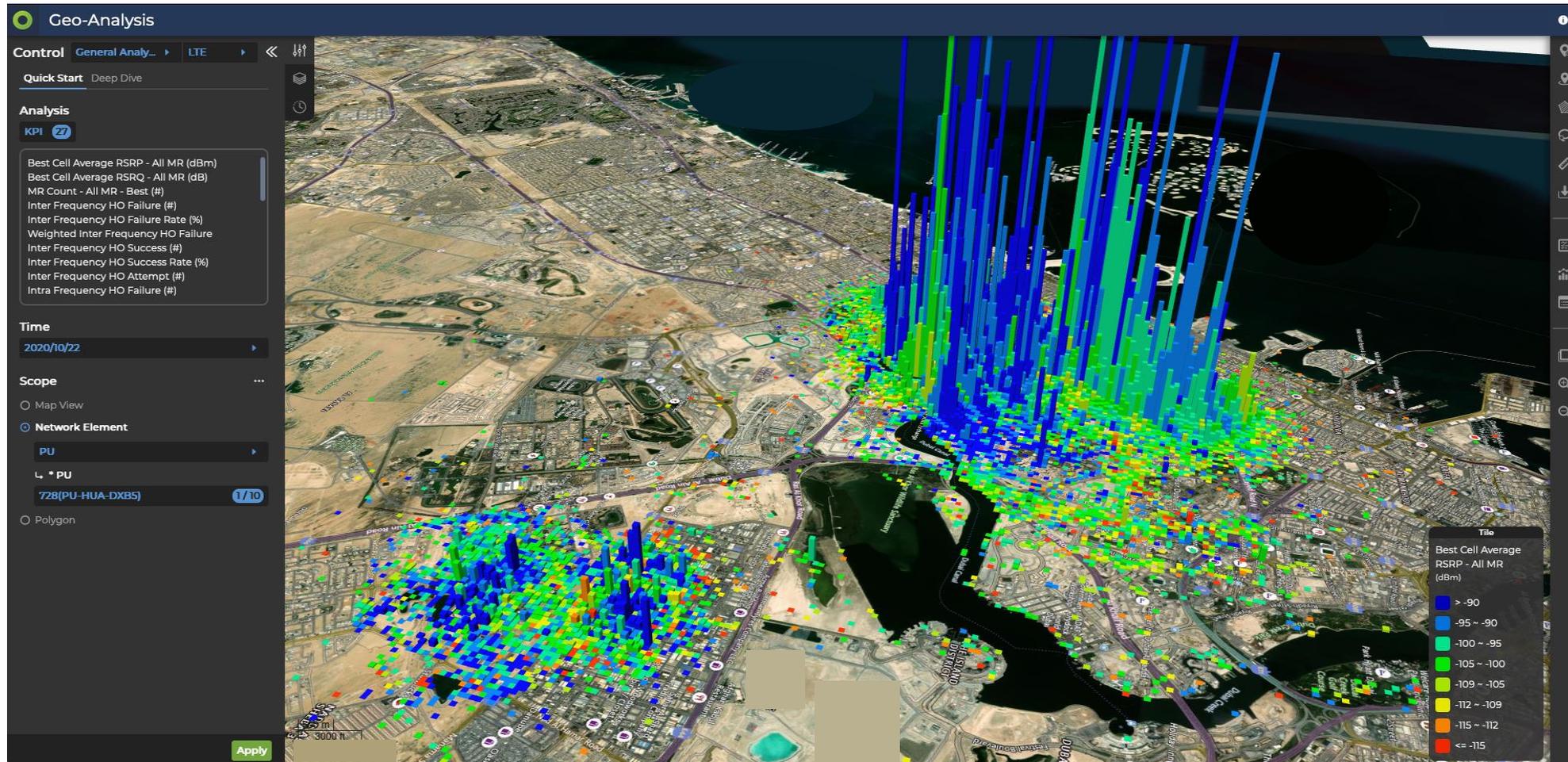
CovMo Demo (2/2)

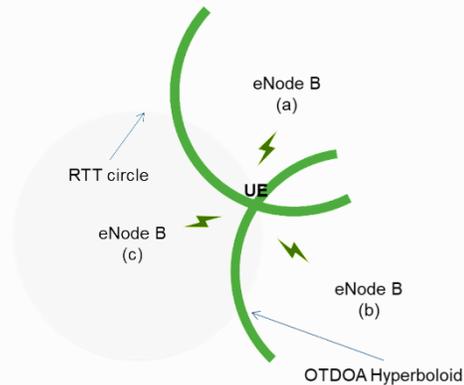## Only Chaos Theory Enabled Geolocation with Proven Indoor Capability

Conventional Positioning Methods

Triangulation

Multilateration

Groundhog Core Technologies

- CovMo leverage human moving pattern and develop sophisticated modeling techniques to understand and predict user mobility pattern with Chaos Theory and Deep Learning

Groundhog Advantages

BEST GEOLOC ACCURACY – VALIDATED BY OPERATORS & VENDORS

Based on 40+ patents

ONLY CHAOS THEORY ENABLED GEOLOC WITH PROVEN INDOOR CAPABILITY

Geolocate down to Indoor Resolution

CLOUD COMPUTING ARCHITECTURE

- **Easy nationwide deployment**
- **24x7 near realtime access**
- **Robust and reliable service**

1st NATIONWIDE 2G+3G+4G+5G GEOLOC DEPLOYMENT

Proven MV, All-RAT Capability

CovMo – High Growth Potential for 5G

- **Telecom industry is highly specialized with high entry barrier.**
- **MNOs tend to select incumbent software supplier for cell expansion and 5G sites.**
- **CovMo is capacity-based license modeling.**

Name of Operator	2G	3G	4G	5G
Saudi Telecom Company		V	V	V
Fareastone Telecom		V	V	V
Emirates Telecommunications	V	V	V	V
Singapore Telecommunications Limited		V	V	V
Singtel Optus Pty Limited		V	V	V
Ooredoo Group	V	V	V	V
Telkomsel	V	V	V	V
Viettel Group		V	V	
Unifi Mobile			V	
SALT Mobile and Monaco Telecom		V	V	
Rakuten Mobile			V	V
Bharti Airtel Limited			V	

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Groundhog Products – Mobility Intelligence™

Mobility Intelligence™

for advertising & market strategy

- **DEP**: Transform mobile subscribers' mobility and online & offline behavior into subscriber insight, with 500+ audience labels and hundreds of customized labels for each subscriber.

- **DSP**: Enable turn-key programmatic mobile advertising services for marketers and advertisers, while eliminating risk of data exposure.

Data monetization for mobile operators.

Find Target Audience with Telco Data

Online Behavior

On-site behavior

```
Base Code ⓘ

<script>
(function(w,d,s,t){
  var f=d.getElementsByTagName(s)[0],j=d.createElement(s);
  j.async=true;j.src='https://hidsp.hinet.net/target/tracker.
  f.parentNode.insertBefore(j,f);
})(window,document,'script','6063f99ce045aa336f20c241');
</script>

Standard Event Code ⓘ

hinetq('track',{event:'AddPaymentInfo'});
hinetq('track',{event:'AddToCart'});
hinetq('track',{event:'AddToWishlist'});
hinetq('track',{event:'Buy'});
hinetq('track',{event:'Cart'});
```
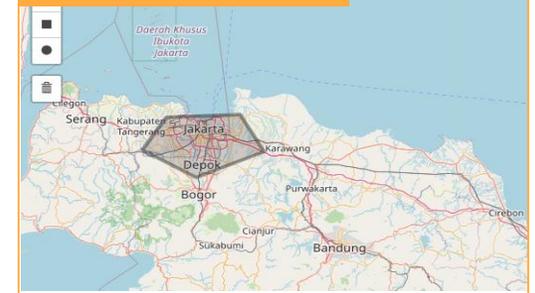
Browsing behavior
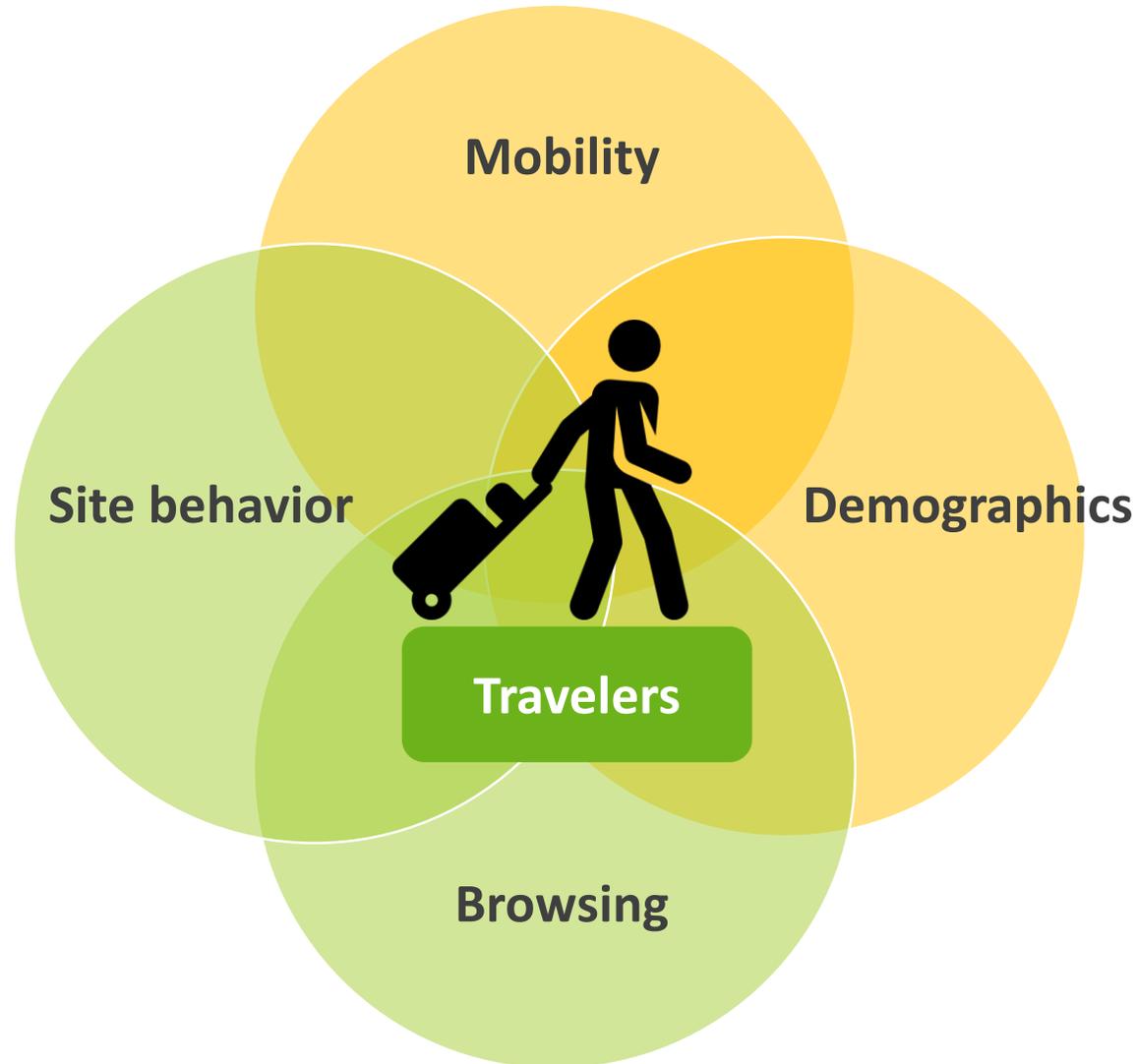
Offline Behavior

Localization

Segmentation

Included Segment #1

Age > 18-24
Gender > Male

Included Segment #2

Travel_Local > Travel_Local

Mobility

Site behavior

Demographics

Travelers

Browsing

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Groundhog Products – RealMotion™

RealMotion™

for public safety

- **Urban planning**: Word Cup, Formula 1, World Expo, city planning.

- **Footprint analysis**: for contact tracing and various applications.

- **Travelers monitoring**: Monitor travelers' mandatory or self-regulating quarantines.

Groundhog's platform as part of national infrastructure.

- **Company Introduction**

- **Products**

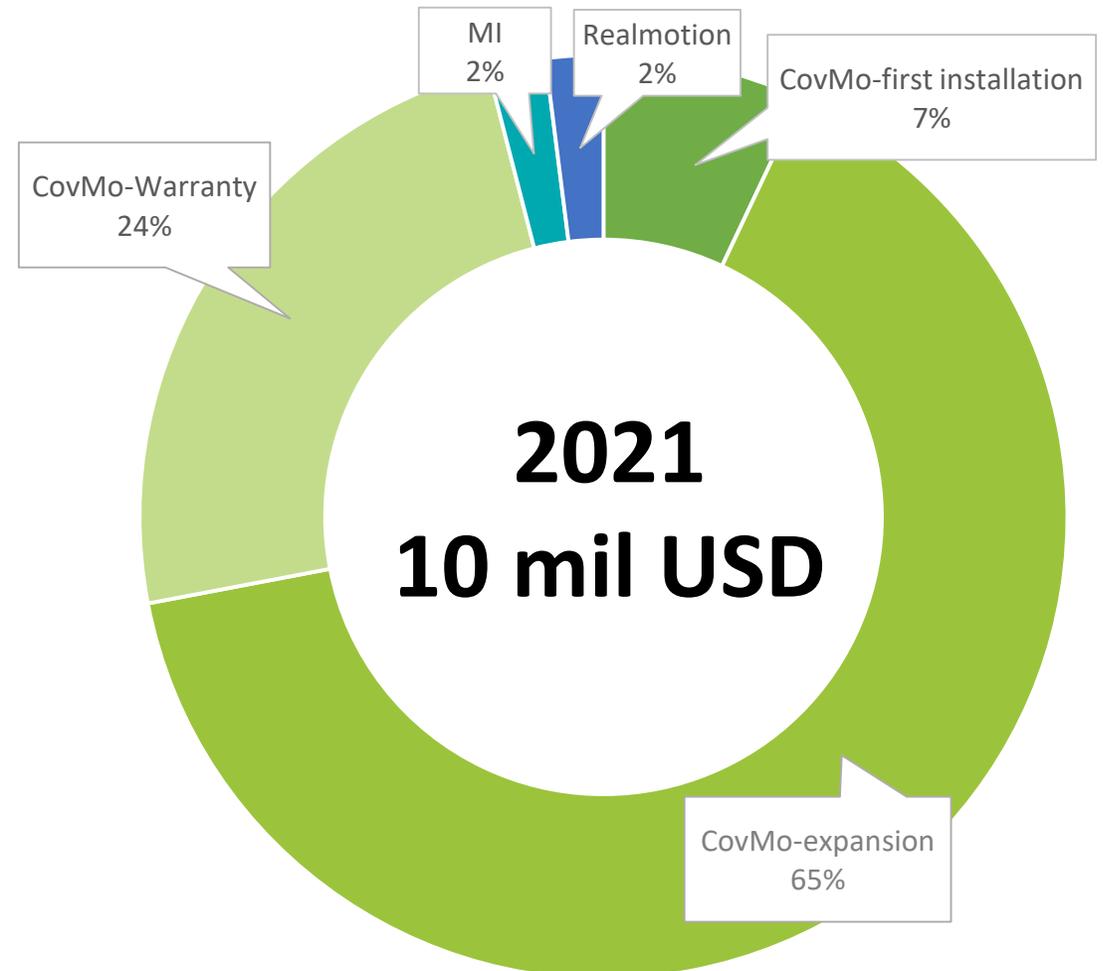- **Financials**

- **Market Trend**

Groundhog Financials – 2020 & 2021

- **No huge increase in CapEx with sales order growth**

- **Gross profit 80%, manufacturing cost $0, service cost 10-20%**

USD thousand	2020	%	2021	%
Revenue	8,282	100%	10,127	100%
COGS	1,668	20%	1,959	19%
Gross profit	6,613	80%	8,168	81%
Operating expense	4,075	49%	5,319	53%
Operating income	2,538	31%	2,849	28%
Pre-tax income	1,690	20%	2,289	23%
Income tax	628	8%	769	8%
Net income	1,061	13%	1,520	15%
EPS	0.05		0.05	

2020 fx rate: 29.55
2021 fx rate: 28.01

Stable Expansion & Warranty Contribution

2020
8 mil USD

- MI 1%
- CovMo-first installation 8%
- CovMo-Warranty 25%
- CovMo-expansion 66%

2021
10 mil USD

- MI 2%
- Realmotion 2%
- CovMo-first installation 7%
- CovMo-Warranty 24%
- CovMo-expansion 65%

CovMo 5G Contribution will Continue to Rise

5G
1%

3G-4G
99%

2020
8 mil USD

5G
13%

3G-4G
87%

2021
10 mil USD

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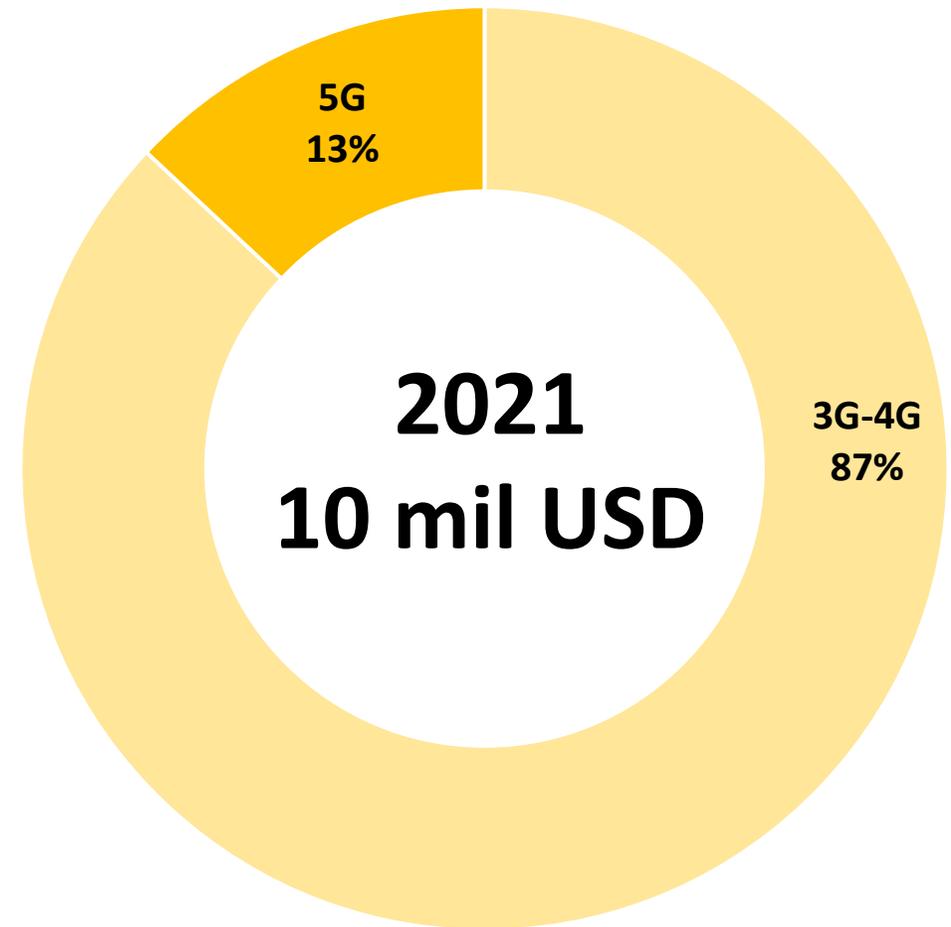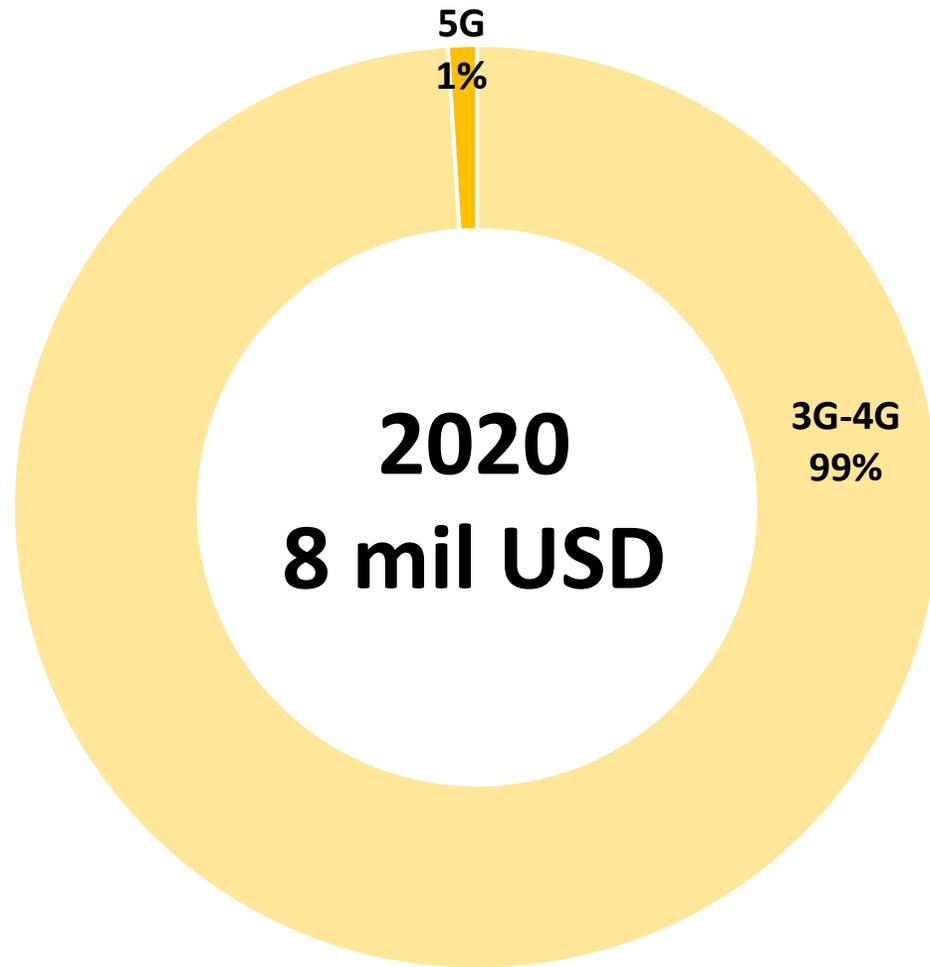
Groundhog Financials – 2022 H1

USD thousand	2022 H1	%	2021 H1	%
Revenue	6,076	100%	2,879	100%
COGS	934	15%	881	31%
Gross profit	5,142	85%	1,998	69%
Operating expense	2,864	47%	2,418	84%
Operating income	2,278	38%	(420)	(15%)
Pre-tax income	3,407	56%	(862)	(30%)
Income tax	502	8%	177	6%
Net income	2,905	48%	(1,039)	(36%)
EPS	0.10		(0.04)	

2021 H1 fx rate: 28.17
2022 H1 fx rate: 28.16

Groundhog Financials – 2022 H1 Breakdown

Revenue by product

MI
1%

Realmotion
2%

CovMo-first installation
22%

CovMo-Warranty
27%

CovMo-expansion
48%

6 mil USD
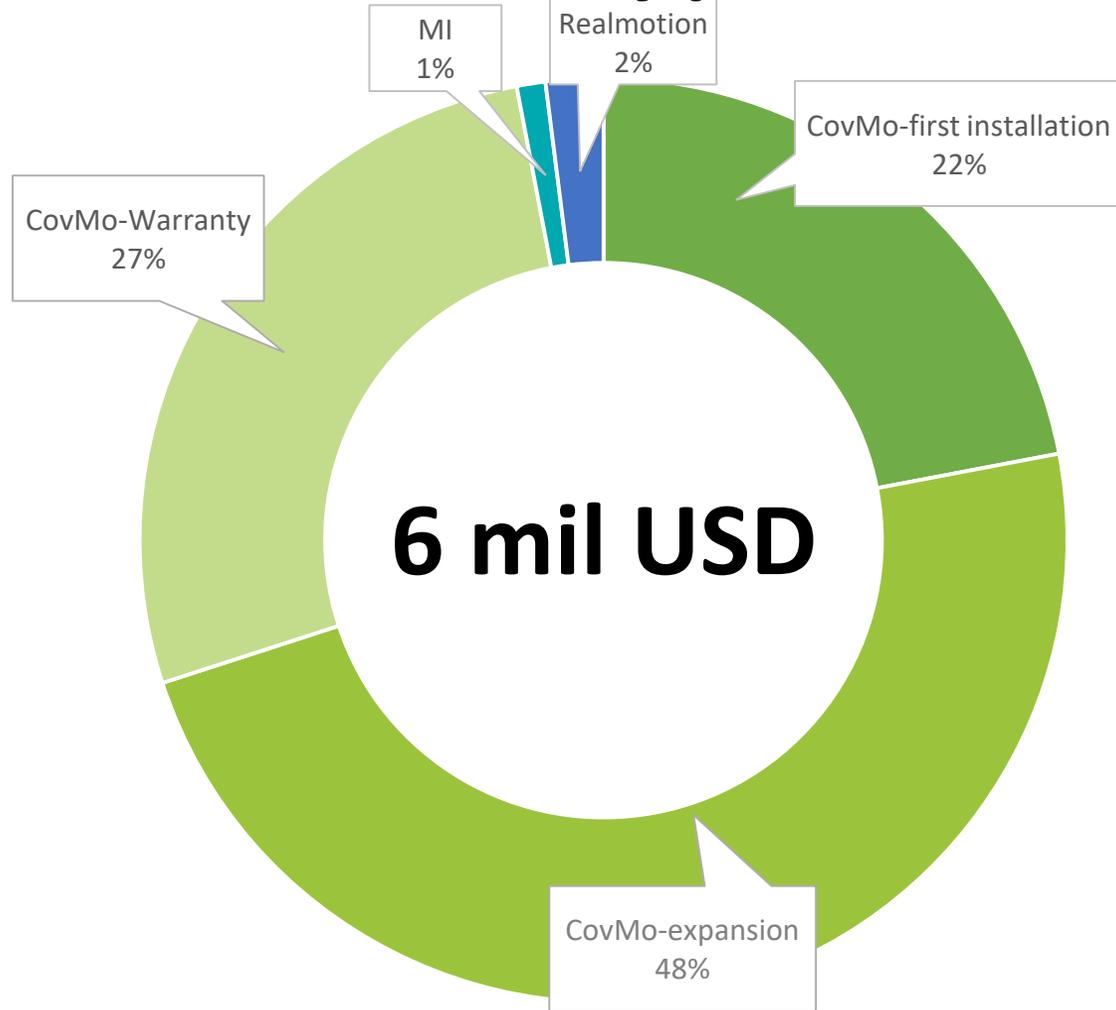
CovMo Revenue by generation

5G
29%

3G-4G
71%

6 mil USD

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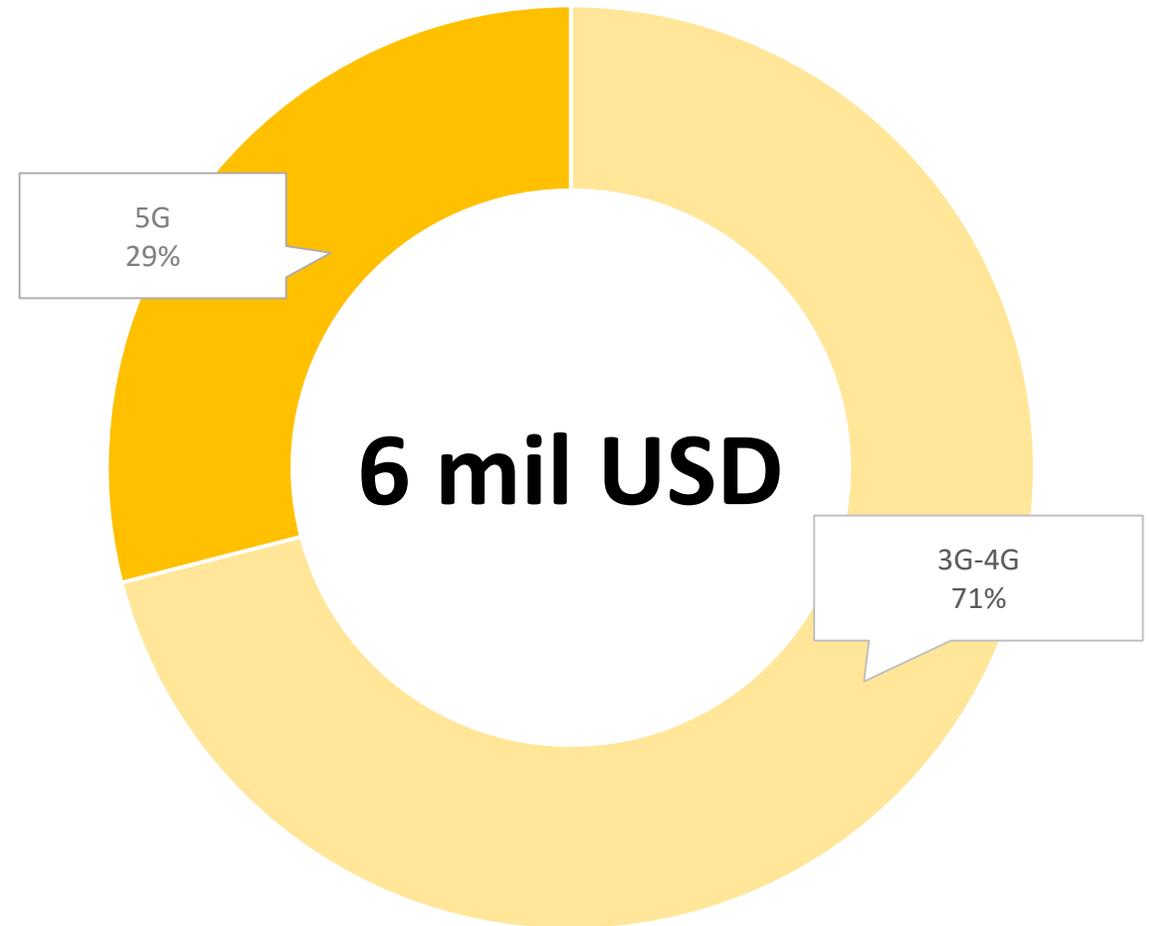
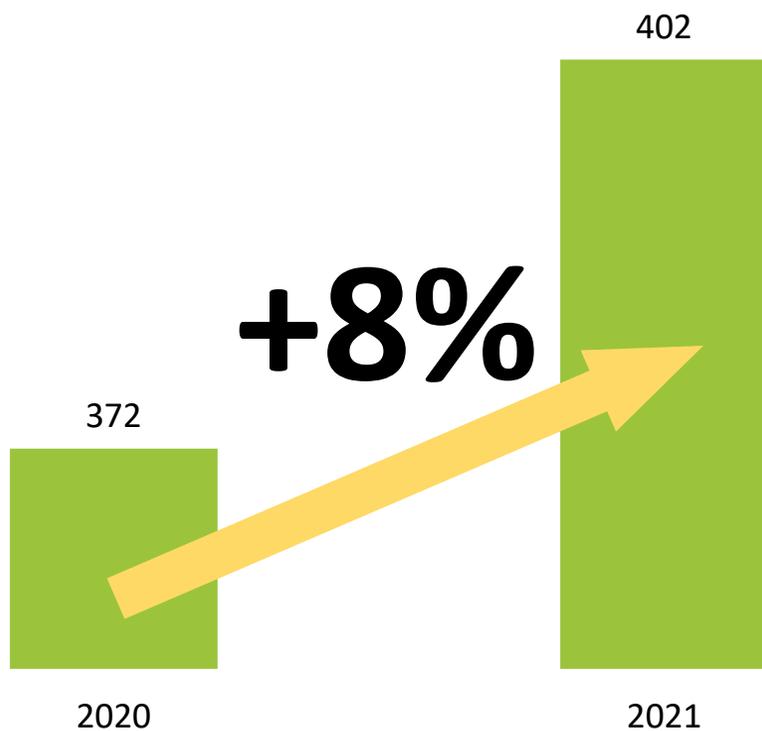# CovMo – Robust ARPU Growth

CovMo ARPU*

USD thousand

374
2020

486
2021

+30%
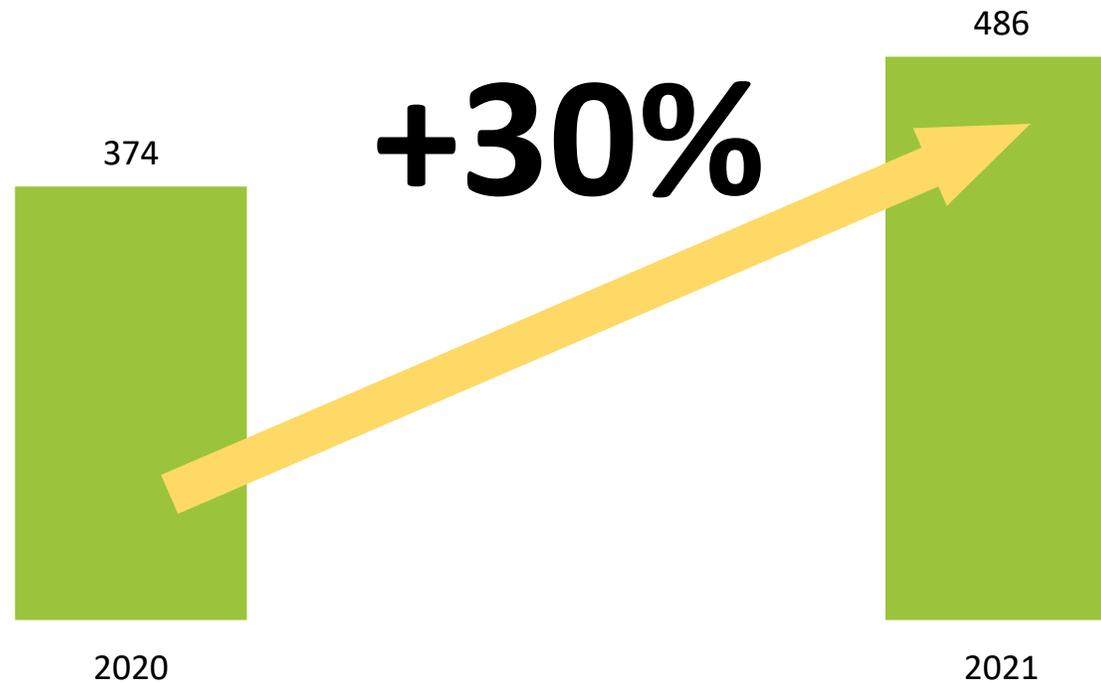
*Average revenue per unit (ARPU) = CovMo revenue / number of CovMo customers
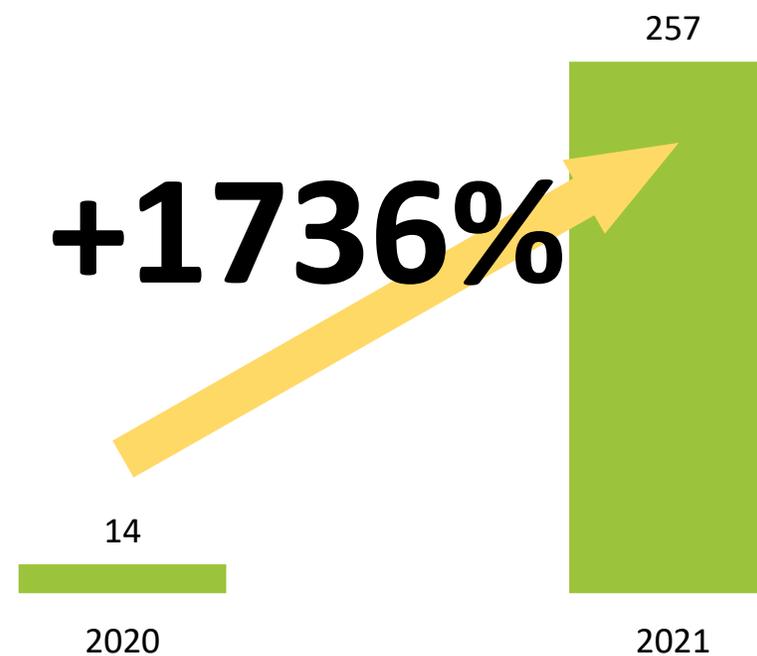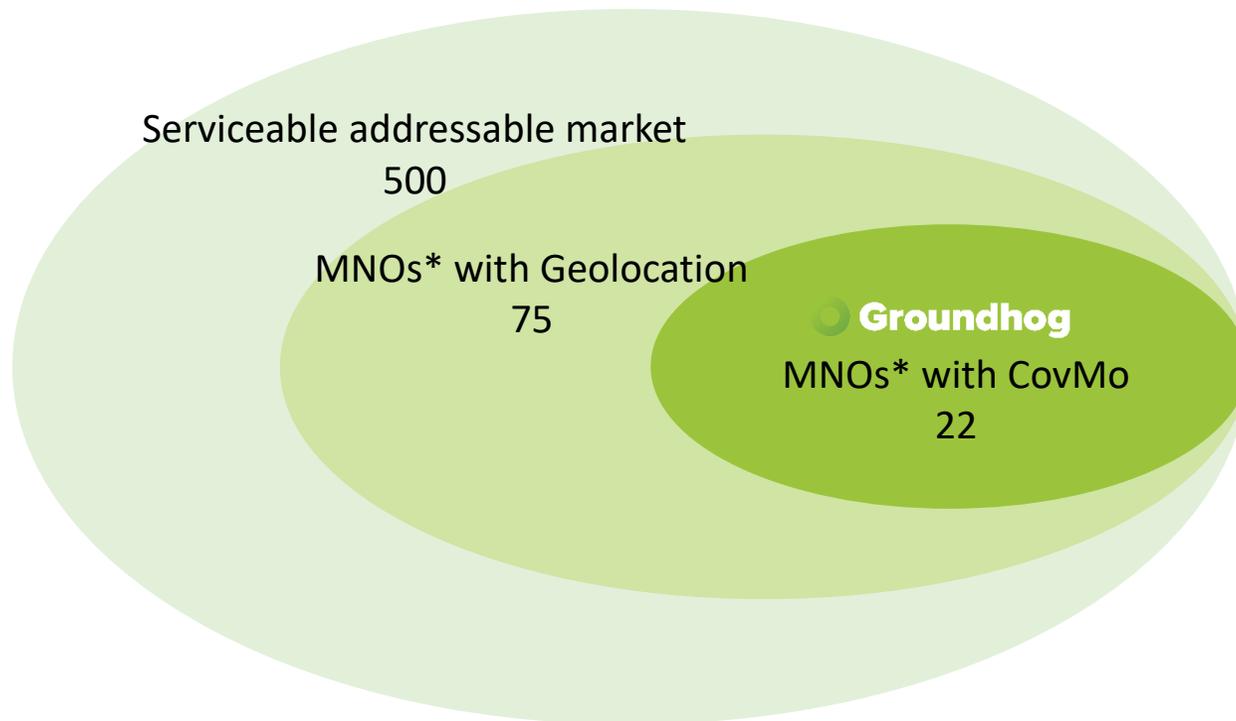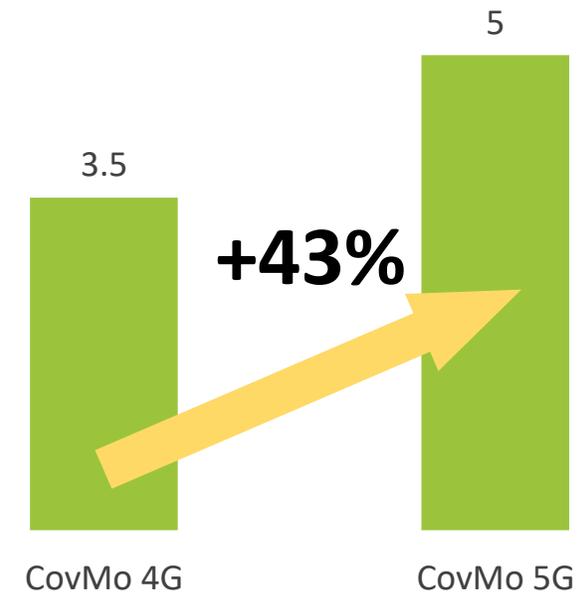
2020 fx rate: 29.55
2021 fx rate: 28.01

CovMo 5G Market Demand

- Annual 5G market demand for Groundhog existing customers: 22 x 5m / 5 = 22 million USD
- Annual 5G market demand for total addressable market: 500 x 5m / 5 = 500 million USD

Serviceable addressable market
500

MNOs* with Geolocation
75

Groundhog
MNOs* with CovMo
22

CovMo 5G & 4G network cost

USD million

5

3.5

+43%

CovMo 4G

CovMo 5G

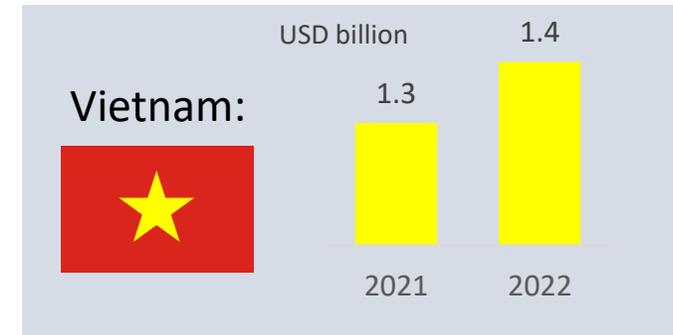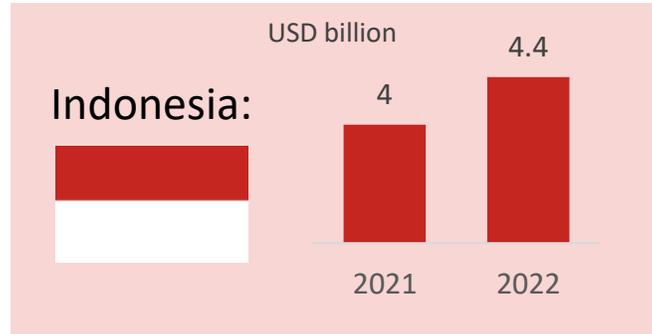*MNOs: Mobile network operators
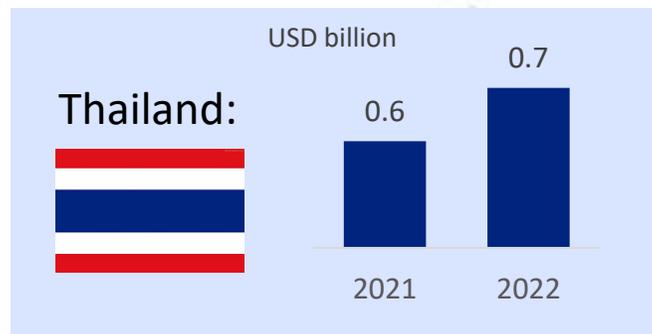Source: Global Mobile Suppliers Association, Groundhog

Mobility Intelligence Market Potential

Digital Ad spending by 2022:

Indonesia:

USD billion

4 (2021)
4.4 (2022)

Vietnam:

USD billion

1.3 (2021)
1.4 (2022)

Total Addressable Market in 2022:

6.8 Billion USD

Thailand:

USD billion

0.6 (2021)
0.7 (2022)

Bangladesh:

USD billion

0.27 (2021)
0.3 (2022)

Source: Research and Markets, Digital Advertising Association of Thailand, Statista
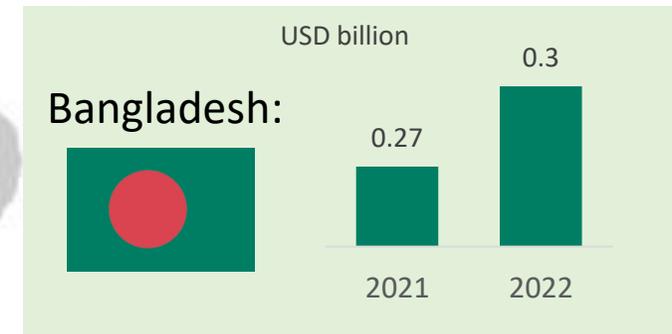
Repeating Business Accounts for 90% of Revenue

■ Revenue from repeating business   ■ Revenue from non-repeating business

8%	4%	2%	9%	11%
92%	**96%**	**98%**	**91%**	**89%**
2017	2018	2019	2020	2021
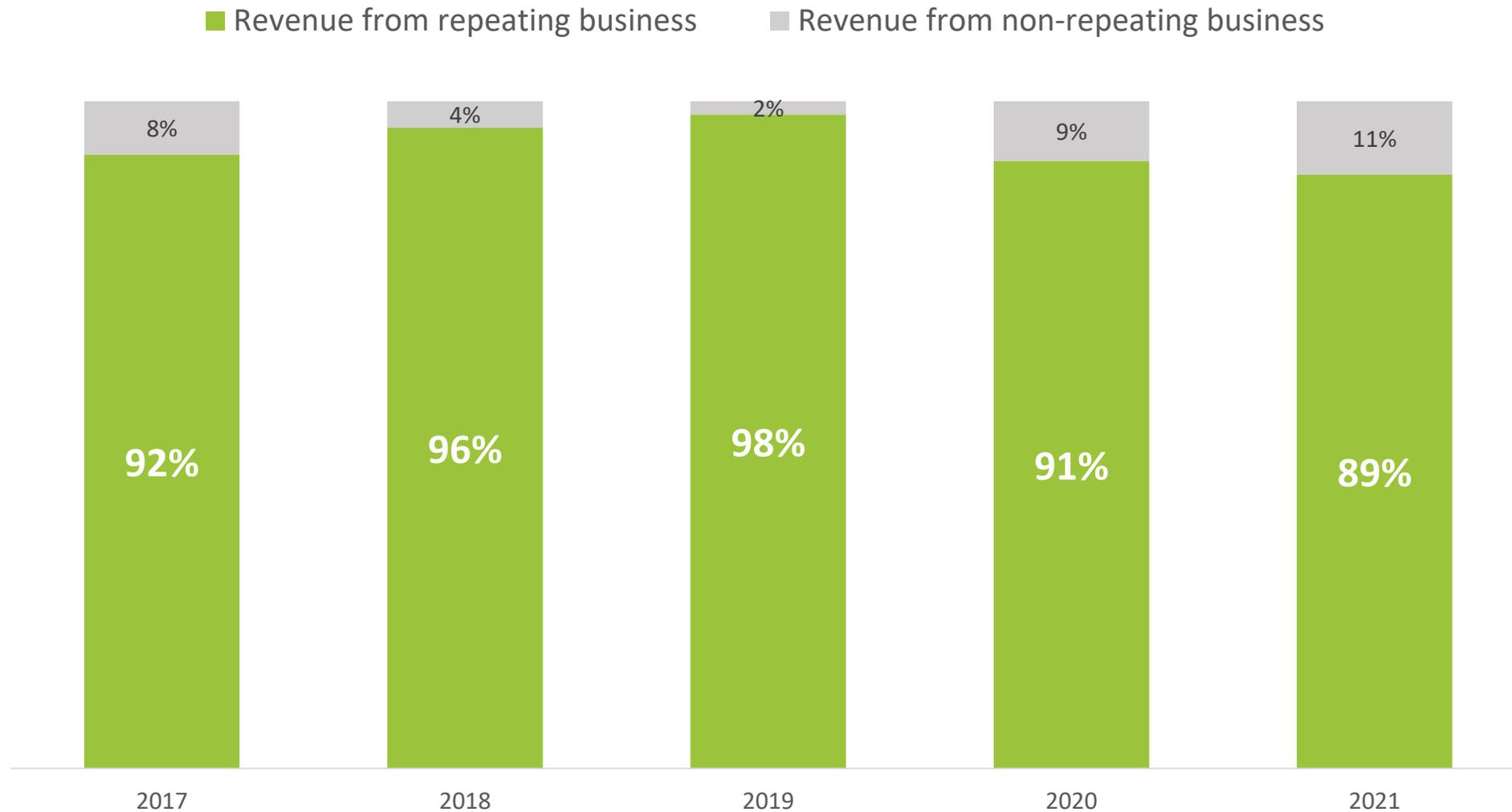
* Repeating business includes CovMo cell expansion and warranty

Revenue by Region

2020
8 mil USD

Others 24%
Saudi Arabia 20%
Indonesia 19%
Japan 16%
UK 8%
India 7%
Taiwan 6%

2021
10 mil USD

Others 20%
Indonesia 29%
Taiwan 15%
India 14%
Saudi Arabia 11%
Japan 6%
Qatar 5%
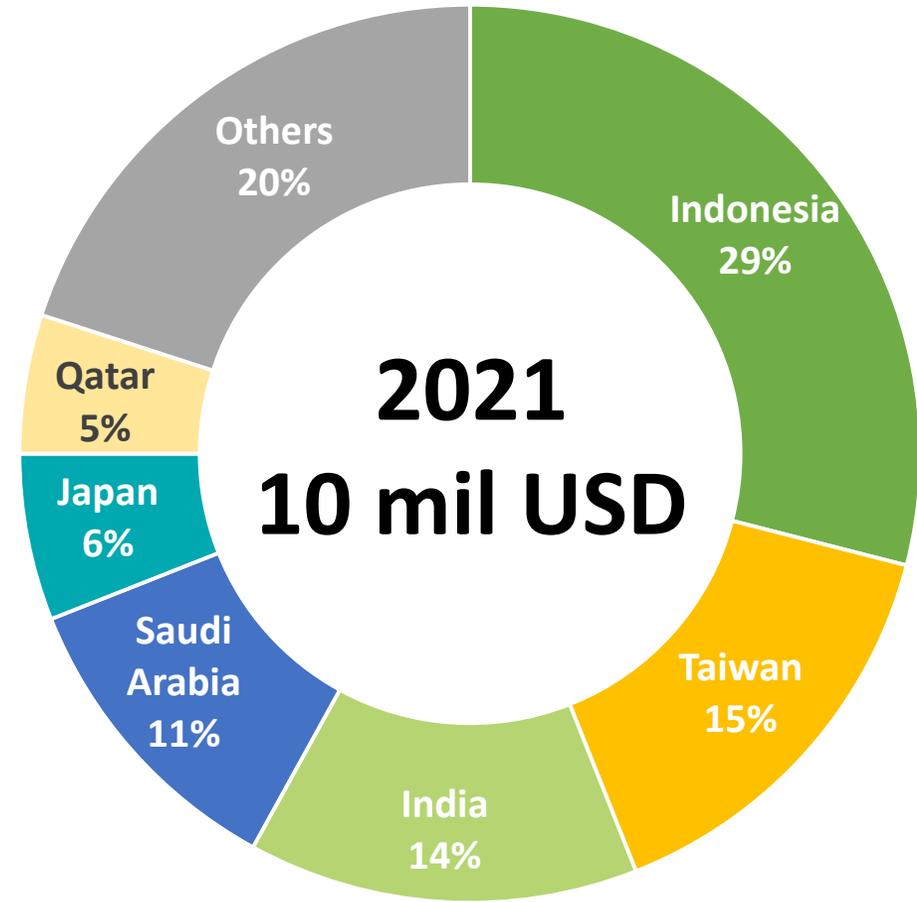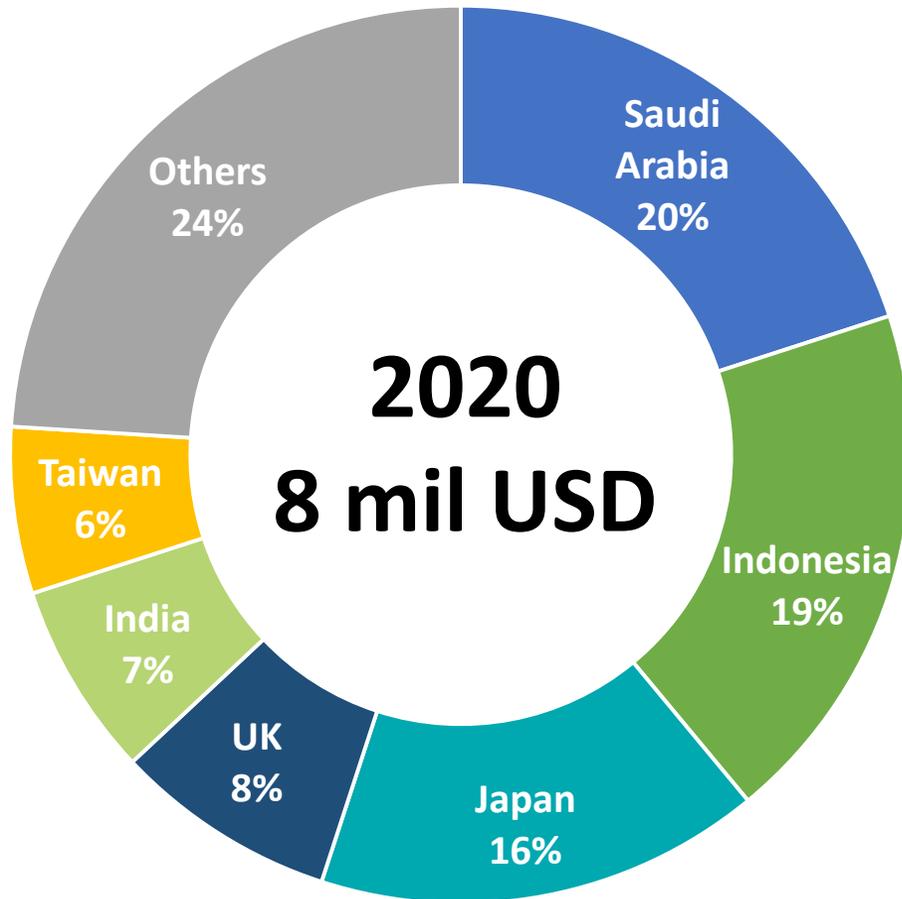
2020 fx rate: 29.55
2021 fx rate: 28.01

Groundhog Financials - Revenue

Robust Revenue Growth

USD thousand

USD thousand

+30%
13,212

+111%
6,076

+22%
10,127

8,282

2,879

2020

2021

TTM (2021.07-2022.06)

2021 H1

2022 H1

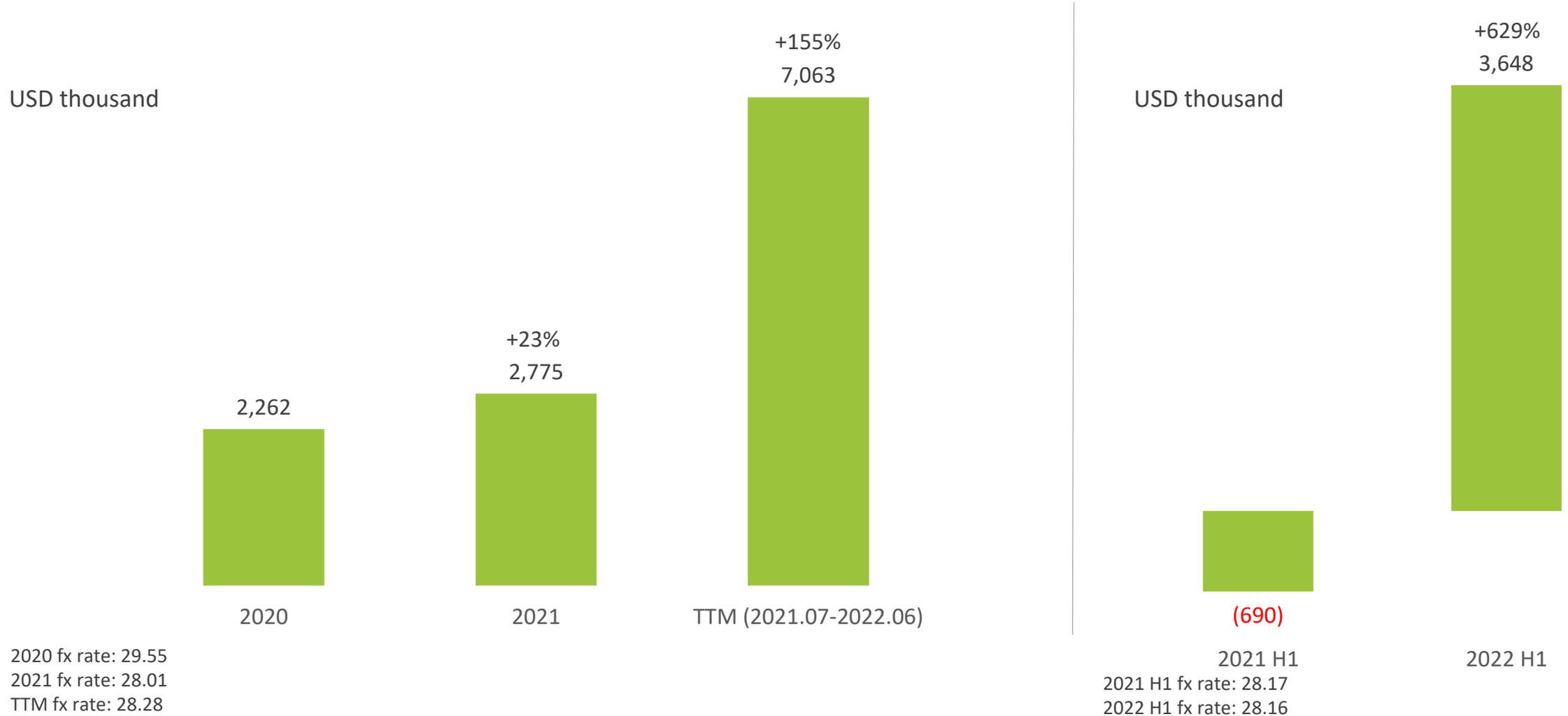2020 fx rate: 29.55
2021 fx rate: 28.01
TTM fx rate: 28.28

2021 H1 fx rate: 28.17
2022 H1 fx rate: 28.16

Groundhog Financials – EBITDA

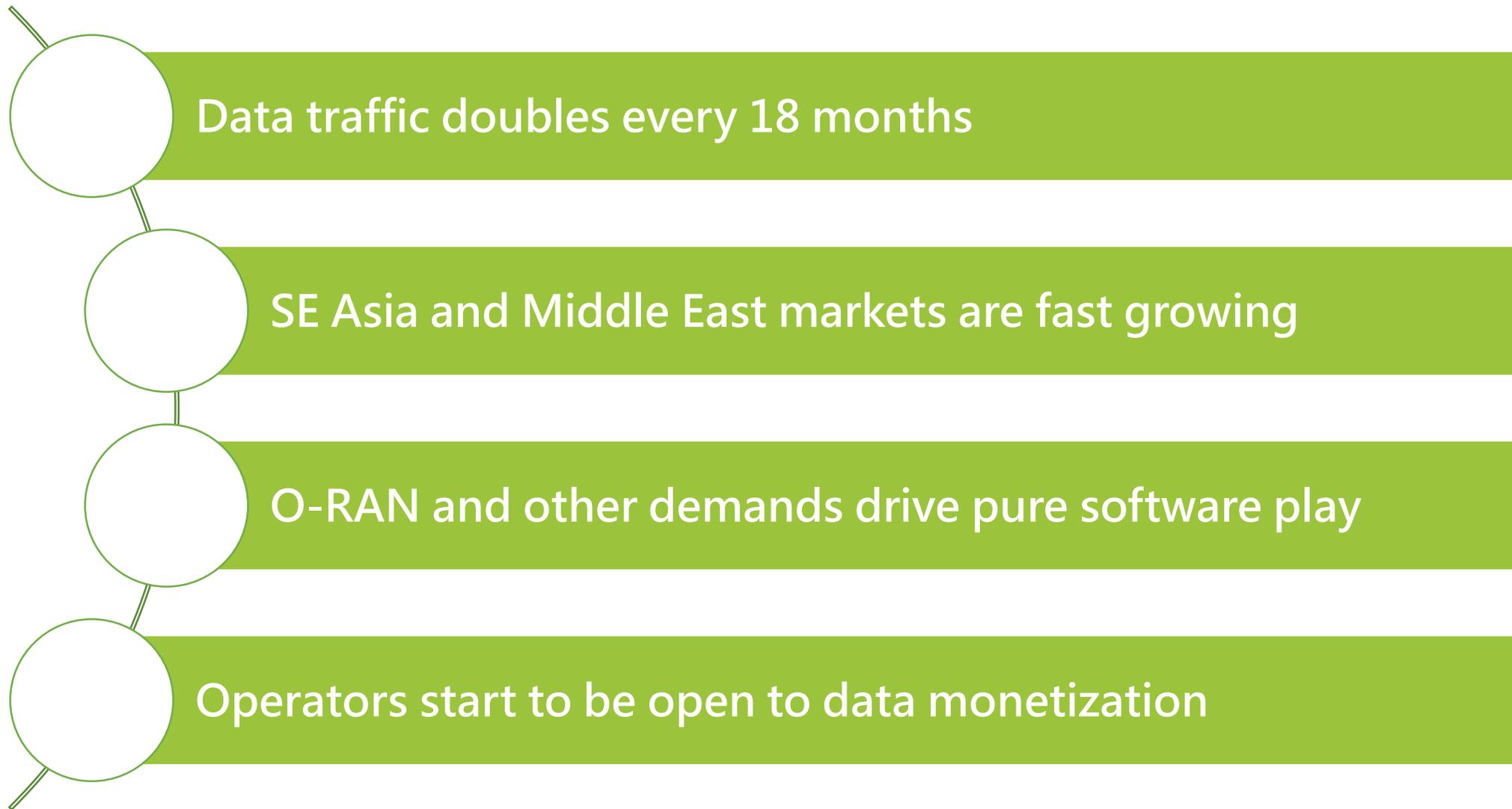## Strong EBITDA Growth driven by Incremental Revenue

Incremental cost is small for module-based software product

USD thousand

+155%
7,063

+23%
2,775

2,262

2020

2021

TTM (2021.07-2022.06)
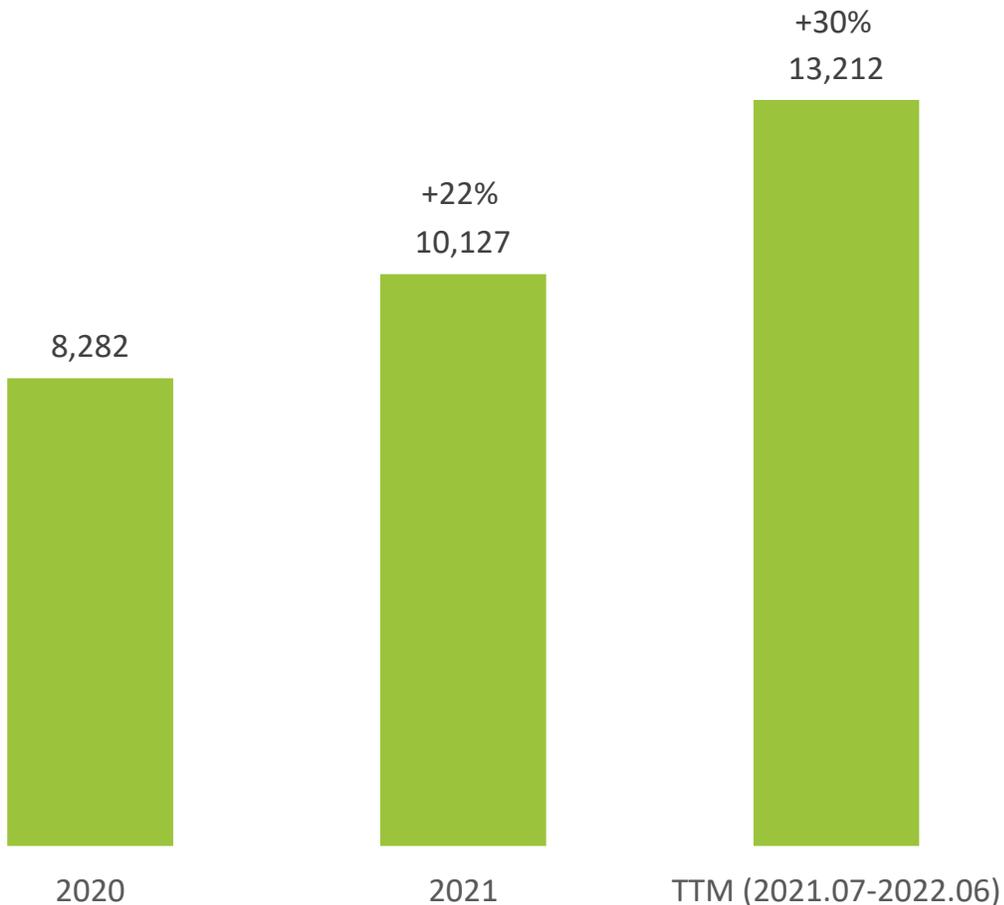
2020 fx rate: 29.55
2021 fx rate: 28.01
TTM fx rate: 28.28

USD thousand

+629%
3,648

(690)

2021 H1

2022 H1

2021 H1 fx rate: 28.17
2022 H1 fx rate: 28.16

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- **Company Introduction**

- **Products**

- **Financials**

- **Market Trend**

Market Trend

Data traffic doubles every 18 months

SE Asia and Middle East markets are fast growing

O-RAN and other demands drive pure software play

Operators start to be open to data monetization

Groundhog continues to scale up...

Leading technology in highly specialized field

International customer base with increasing market share

Foreseeable revenue growth from 5G, O-RAN, and data traffic

High TAM for Mobility Intelligence with unique advantage

Thank you.

Groundhog

Groundhog Inc.

www.ghtinc.com