Andes Technology Corp.
Investor Conference Report
Safe Harbor Notice

Except for the historical information contained herein, the matters addressed in this presentation are forward-looking statements that involve certain risks and uncertainties that could cause actual results to differ materially, including but not limited to weather, impact of competitive products and pricing, industry-wide shifts in the supply and demand for semiconductor products, rapid technology change, semiconductor industry cycle, and general economic conditions.

Except as required by law, Andes undertake no obligation to update any forward-looking statement, whether as a result of new information, future events or otherwise.
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Company Overview

http://www.andestech.com
Founded in March 2005 in Hsinchu Science Park, Taiwan, ROC.
Well-established high technology IPO company
Over 260 people; 80% are engineers.
TSMC OIP Award “Partner of the Year” for New IP (2015)
Founding Premier membership in the RISC-V International Association (RISC-V Foundation) (2020)
AI Global Media Award “Most Outstanding Embedded Processor IP Supplier” (2020)
Hsinchu Science Park Innovation Award - AndesCore™ NX27V (2020)
EE Awards - “Taiwan-Product Award” & ”Asia-Company Award” (2021)

Innovate performance-efficient processor solution for low-power SoC
Smart and Green electronic devices
Cloud Computing and Internet of Things and Machine Learning
Business Status Overview

- **200+** commercial licensees
  - Geographically distributed in Taiwan, China, Korea, Japan, Europe, and USA
  - **500+** license agreements signed

- **AndeSight™ IDE:**
  - **22,000+** installations

- **Eco-system:**
  - **500+** partners

- **10B+** Accumulative SoC Shipped
Operation Results
4Q21 Revenue Analysis

(NT$ thousands)

- QoQ: +40%
- YoY: +0.2%

4Q20: 268,585
3Q21: 192,228
4Q21: 269,054
21Q1-Q4 Revenue Analysis

YoY
+41.1%

(NT$ thousands)

20 Q1-Q4: 581,012
21 Q1-Q4: 819,778
21Q1-Q4 Top 10 Customers Analysis by Revenue

Top 10 Customer Contributed 56% Revenue

(NT$ thousands)
4Q21 Royalty Analysis

- **YOY**: +7.6%
- **QoQ**: -4.4%

(NT$ thousands)

<table>
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<tr>
<th></th>
<th>4Q20</th>
<th>3Q21</th>
<th>4Q21</th>
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<tbody>
<tr>
<td>Amount</td>
<td>58,353</td>
<td>65,668</td>
<td>62,772</td>
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<tr>
<td>Growth</td>
<td></td>
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21Q1-Q4 Royalty Analysis

YoY +47.2%

(NT$ thousands)

20 Q1-Q4: 158,792
21 Q1-Q4: 233,676
Royalty Analysis

(NT$ thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>Royalty (Numbers)</th>
<th>Customer numbers</th>
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<tbody>
<tr>
<td>2011</td>
<td>445</td>
<td>1</td>
</tr>
<tr>
<td>2012</td>
<td>660</td>
<td>2</td>
</tr>
<tr>
<td>2013</td>
<td>1,285</td>
<td>5</td>
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<tr>
<td>2014</td>
<td>10,819</td>
<td>9</td>
</tr>
<tr>
<td>2015</td>
<td>12,232</td>
<td>15</td>
</tr>
<tr>
<td>2016</td>
<td>13,320</td>
<td>15</td>
</tr>
<tr>
<td>2017</td>
<td>38,287</td>
<td>25</td>
</tr>
<tr>
<td>2018</td>
<td>74,953</td>
<td>28</td>
</tr>
<tr>
<td>2019</td>
<td>106,716</td>
<td>33</td>
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<tr>
<td>2020</td>
<td>158,792</td>
<td>41</td>
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<tr>
<td>2021</td>
<td>233,676</td>
<td>51</td>
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21Q1-Q4 Top 10 Customers Analysis by Royalty

Top 10 Royalty Customers Contribution Analysis: 86%

(NT$ thousands)
21Q1-Q4 Revenue Analysis by Payment Model

- License Fee: 60%
- Running Royalty: 28%
- Maintenance & Others: 9%
- Custom Computing Service: 3%
21Q1-Q4 Revenue Analysis by Region

- Taiwan: 34%
- USA: 25%
- Japan: 2%
- Europe: 2%
- China: 3%
- Korea: 2%
21Q1-Q4 Revenue Analysis by Product
4Q21 Revenue Analysis - RISC-V

(NT$ thousands)

- 4Q20: V3 - 105,012 (39%), RISC-V - 163,573 (61%)
- 3Q21: V3 - 79,530 (59%), RISC-V - 112,698 (70%)
- 4Q21: V3 - 79,614 (30%), RISC-V - 189,439 (70%)
21Q1-Q4 Revenue Analysis - RISC-V

2020 Q1-Q4
- V3: 242,319 (42%)
- RISC-V: 338,693 (58%)

2021 Q1-Q4
- V3: 293,604 (36%)
- RISC-V: 526,173 (64%)

(NT$ thousands)
Product Applications

http://www.andestech.com
Andes Updates

- A 17-year-old public CPU IP company
- 3B+ Andes-Embedded SoC annually in 2021

- A founding premier member of the RISC-V International
- An active role in RISC-V International & its extension task groups
  - RISC-V Board Director
  - Member of Technical Steering Committee
  - RISC-V Ambassador
  - Chair of P-extension (Packed DSP/SIMD) Task Group
  - Co-chair of Fast Interrupt Task Group
  - Vice Chair of TEE Task Group

- A major open source maintainer/contributor
Andes Embedded in Various Applications

- In leading machine learning computers for datacenter
- In tier-one switch routers for datacenter
- Recent applications: 5G networking, WiFi 6/7, AI processors (using Andes Custom Extension, ACE)

Andes Embedded in Smart Phones

Sensor Hub

WiFi/ BT/ GPS/ FM (combo)

NFC Controller

Storage Controller

Touch Screen Controller

Smart Speakers: WiFi IoT

Bike Sharing: GPS Ctrl

X-Trail: ADAS Ctrlr

Switch: Game Flash Ctrlr
V5 Adoptions: From MCU to Datacenters

- **Edge to Cloud**
  - ADAS
  - AIoT
  - Blockchain
  - FPGA
  - MCU
  - Multimedia
  - Security
  - Wireless (BT/WiFi)

- **40nm to 5nm**
- **Many in AI**

- **Datacenter AI accelerators**
- **SSD: enterprise (& consumer)**
- **5G macro/small cells**

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**Cloud**

**Personal**

**IOT Edge**
Andes RISC-V Cores Adopted in SoC
New Products and Ecosystems

http://www.andestech.com
Andes RISC-V Product Overview

**AndeStar™ Architecture V5**

*Highly optimized design with leading PPA*

*Handy peripheral IPs to speed up SoC construction*

**AndesCore™ Processors**

**AndeShape™ Platforms**

**AndeSoft™ Stacks**

**AndeSight™ Tools**

*Professional IDE with high code quality*

*Extensive SW stacks from bare metal, RTOS to Linux*

*Best extensions to RISC-V*
## Andes V5 Architecture for All Levels of Computing

### AndeStar™ V5 CPUs
- **Andes Extension**
- **RISC-V**
- **Andes Technology**

<table>
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<tr>
<th>Series</th>
<th>Description</th>
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<tbody>
<tr>
<td>N/D-series</td>
<td>N22 N(X)25 D25...</td>
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<tr>
<td>A-series</td>
<td>A(X)25 A(X)27 A(X)45 Multicore...</td>
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<tr>
<td>Vector</td>
<td>NX27V NX45V...</td>
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### Conventional Computing Architecture
- **Leading PPA Embedded Processor**
  - IoT, Sensing, Storage, Audio, GPS

### Domain Specific Architecture (DSA)
- **Andes Custom Extension**
- Define custom instruction to handle time critical codes
- Better approach for accelerator/co-processor to do particular jobs
- Automation Tool for the generation of toolchain, ISS, partial RTL and verification

### High Performance and Power Efficient AP
- 5G, AI, Datacenter, Video Surveillance, Networking

### Cray Style, Scalable Vector Processor
- Datacenter, Server, Deep Learning
Andes RISC-V Product Roadmap

**RV32/RV64**

- **Cache-Coherent 1-4 Cores**
  - A25MP
  - AX25MP

- **Linux with FPU/DSP**
  - A25
  - AX25

- **Fast/Compact with FPU/DSP**
  - N25F
  - D25F
  - NX25F

**5-stage (1.1 GHz)**
- >3.53 Coremark/MHz

**27-Series:**
- Vector Ext. MemBoost
- NX27V
- A27/AX27
- A27L2/AX27L2
- and more.

**Superscalar**
- Dual Issue MemBoost
- N45/NX45
- D45
- A45/AX45
- A45MP/AX45MP
- and more.

**45-Series:**
- 8-stage (1.2 GHz)
- >5.50 Coremark/MHz

**Benefits**
- 512-bit SIMD raises MobileNet by 66x (CNN for mobile vision)
- Boost performance by 50%
- Raise bandwidth to 3x; Cut latency by 40%

**5-stage (1.1 GHz)**
- >3.53 Coremark/MHz

**Features**
- Vector Ext.
- MemBoost
- Dual Issue
- MemBoost
AndeCore™ 45-Series

32-bit AndesCore™ N45/D45/A45/A45MP
64-bit AndesCore™ NX45/AX45/AX45MP
AndesCore™ 45-Series Overview

- 8-stage In-Order Dual-Issue
- AndeStar™ V5 ISA:
  - RV*GCN (S/D FPU): All Series
  - RV*P-ext (DSP/SIMD): D45/A(X)45
  - MMU for Linux Applications: A(X)45
- MemBoost memory subsystem
- Low power dynamic branch prediction
- Unaligned data accesses
- Fast or small multiplier
- StackSafe™ (Andes Ext.)
- CoDense™ (Andes Ext.)
- Multi-core support: A(X)45MP
AndesCore™ 45 vs. 25 Series Performance Enhancement

- > 1.5X Coremark & Dhrystone performance enhancement, compared with single-issue 25 series
AX45 Can Do More (vs. 64bit A-series)

- **A53**
  - 8-stage In-Order Dual Issue
  - Widely adopted by industries in many applications

- **AX45**
  - 8-stage In-Order Dual Issue
  - Performance is better!
    - Coremark/MHz: 1.32x
    - Dhrystone/MHz: 1.37x
Target Applications of 27 & 45-Series

- AI/Deep Learning
- AR/VR
- 5G
- Video Surveillance
- Networking
- Storage
- ADAS
- V2X (Vehicle to Everything)
- Metaverse and more...
Andes Processors to Fit Your AI

- Voice trigger
- Voice command
- Always-on
- Face trigger
- Object detection
- Intelligent HMI
- Barge-in
- Beamforming
- Speech to text
- Natural language
- Face unlock
- Bokeh
- Avatar
- SLAM
- Gesture recognition
- High resolution
- > 1 camera

N-Series CPUs
D/A-Series CPUs
Vector CPUs

Smart IoT Devices
Smart Home
Smart Camera
Mobile AR/VR Surveillance
Automotive
Data Center

~30 MOPS
~100 MOPS
> 1 GOPS
>1 TOPS
>10 TOPS
>100 TOPS

ADAS, HDR
> > 10 cameras

>1 TOPS
>100 TOPS

>10 TOPS

> 10 cameras

>1 GOPS

>1 TOPS

~100 MOPS

~30 MOPS

~100 MOPS

> 1 GOPS

>1 TOPS

>10 TOPS

>100 TOPS

ANDES TECHNOLOGY
RISC-V DSP Extension

- Andes contributed market-proven DSP (SIMD) as P-Extension
- Designed to accelerate slow video, audio/voice and low data rate DSP workloads

Increase power efficiency to your DSP applications
NX27V One Vector for All Implementations

Cloud Computing – Datacenter, HPC, Server

Edge Computing – 5G, Vision Processing

Endpoint Computing – Natural Language Processing

* Configurable compute data width (VLEN)
Andes Custom Extension

- ACE unlocks RISC-V’s Potential of DSA
  - Define ACE instruction to handle time critical codes
  - Another approach to co-processor or accelerators

- All-in-one COPilot development environment
  - Automation tool and ease of use
  - Extensions are easy to re-use, can be used as a library
Taking RISC-V Cores to Next Level

❖ Andes is the *world-leading* supplier shipping the commercial RISC-V cores to market with the support of

- **P-Extension**
  - D25, D45, A(X)25(MP), A(X)27(L2), A(X)45(MP)

- **V-Extension**
  - NX27V, NX45V

- **Custom-Extension** *(w/ ACE* support)*
  - Entire 25, 27, 45 series

*: Andes Custom Extension
Bring Andes Strength to RISC-V Cores

**Performance & Extensibility**
- Leading PPA and code size
- Rich data processing in P, V, and ACE

**Configurability**
- Flexible configurations for rich features

**Maturity**
- Compiler optimizations, and SW stacks
- Comprehensive features in AndeSight IDE
Aggressive in RISC-V Community

Foundation Task Groups (partial list)

- Contributing hardware architecture extensions
  - Chair of the P-extension (Packed SIMD/DSP) Task Group
  - Co-chair of Fast Interrupts Task Group
  - Closely reviewing activities of other Task Groups
Andes Helps Strengthen RISC-V Ecosystem

- More choices for customers are good
- Andes works closely with partners to grow RISC-V ecosystem
Andes Position in RISC-V

Complete product portfolio

Reliable RISC-V core IP vendor

Extreme low power consumption, high computing efficiency

World’s leading P-, V- and Custom-Ext. Capable RISC-V cores

Professional custom computing service
Concluding Remarks

http://www.andestech.com
Andes Technology

Successfully rolled out new series of RISC-V cores (w/ leading P-, V- and Custom-Ext.), custom computing service and FreeStart program to extend more oppy.

Aggressively involved in RISC-V International new technology development, contributing and leveraging RISC-V eco-system.

Becoming a technology contributor, market promoter, and sales leader in the RISC-V industry
Thank You

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