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ARTILLRY INTELLIGENCE BRIEFING

ARCORE AND ARKIT: ACCELERATING MOBILE AR
SEPTEMBER 2017

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Executive Summary

Over the past six months, the tech sector has reined in its initial excitement about glasses-based augmented reality (AR). This includes realigned expectations on the time horizon to consumer ubiquity. But in the meantime, the AR world is keeping busy with another opportunity: mobile AR.

Beyond specs (battery life, field of view, etc.), AR glasses' detriment is form factor: It needs to be sleek and cheap enough to sway consumers to reconcile a key point of friction: personal style. The bar is set high for anything people are asked to put on their face, as Google Glass taught us.

This concern goes away in enterprise contexts (the topic of another report) but is a sizeable barrier in consumer markets. And we're a few years from marketable formats. The good news is that the stepping stone — or gateway drug as we like to call it — is mobile AR. And there's a lot happening.

Going by the numbers, mobile AR's addressable market isn't the low-millions of headsets: it's the 3.2 billion global smartphones today and 4.6 billion by 2020. Those aren't all AR compatible in terms of optical and processing components, but most will be over the next replacement cycle (2.5 years).

Google's AR development kit ARCore will become compatible with 3.6 billion global android devices during this time frame, and Apple's ARkit will reach 673 million iPhones. Both achieve AR through software, utilizing the standard smartphone RGB camera, thus lowering the barrier to "true AR."

Compared to graphics that simply overlay a scene, true AR infuses graphics that interact with physical objects in dimensionally accurate ways. ARCore and ARKit apply simultaneous localization and mapping (SLAM) through a surface detection approach that doesn't require advanced optics.

The result is an overall democratization of advanced AR capability. This starts with the massive installed base mentioned above, which in turn incentivizes developers with a larger addressable market. Then the content they create entices more users to engage, enacting a virtuous cycle.

Looking forward, we can expect several AR apps as ARCore and ARKit gain footing. But more impactful will be years of third-party innovation with both SDKs. That could rival in creativity and advancement, the app economy itself, which kicked-off ten years ago with the first iOS SDK.

But several questions remain: How quickly will this happen? What are the pros and cons of each AR toolkit? What will be best practices in building, distributing and marketing AR apps? And what does it all mean from where you sit? These questions are tackled throughout this report.

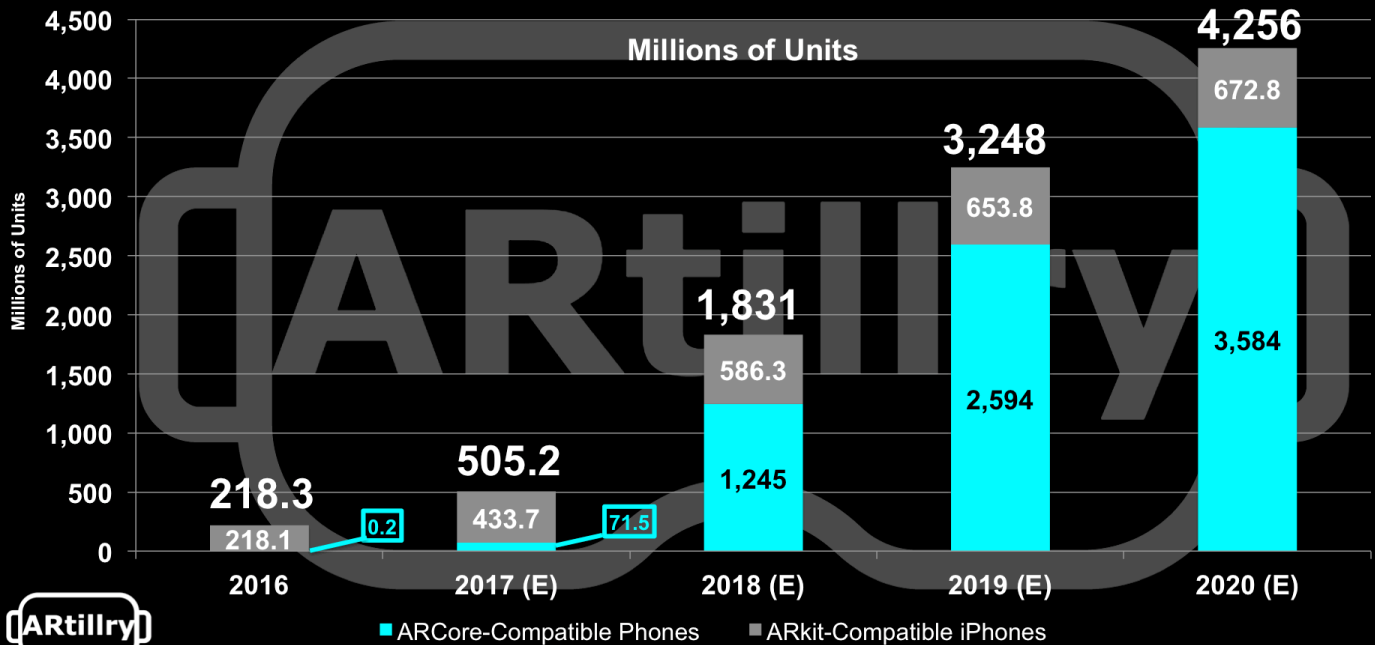Questions and requests for deeper analysis can be submitted at **https://artillry.co/contact/**.

Key Takeaways

- Competition between Google and Apple has intensified over the last decade's "mobile OS wars."
  - Now those OS' respective AR development kits represent the next competitive battleground.
  - Like the mobile OS wars, mobile AR will force platform decisions from developers and users.

- Disappointing AR & VR headset adoption has shifted attention and investment to mobile AR.
  - There are 3.2 billion global smartphones today and ARtillry projects 4.6 billion by 2020.
  - ARCore will reach 3.6 billion smartphones during this time, and ARkit will reach 673 million.
  - This installed base will incentivize developers to place AR into the hands of billions.
  - Compatibility will start slow but grow fast over the next phone replacement cycle (2.5 years).

- ARCore and ARkit work with standard RGB cameras found in most smartphones.
  - Developers don't have to build AR technology from scratch, nor rely on physical barriers like markers or depth cameras. They can focus instead on end-user experiences.

- ARkit has a slight head start in developer interest and invested time.
  - ARkit also has technical advantages in its mapping and iOS development stack (i.e. Metal and Swift), which create more elegant integrations with ARKit.
  - Apple's classic vertical integration of hardware and software gives it greater control over things like camera optics and software updates.

- ARCore has a longer-run advantage in attracting developers, due to Android's greater scale.
  - ARCore is also more open, with a broader arsenal of lower-friction development tools (Tilt Brush and Blocks) and support from adjacent software (Daydream, Tango and Lens).
  - Google is banking on web delivery for AR, accessed through interlinked mobile websites instead of Apple's friction-heavy and siloed app approach.

- Regardless of platforms and the apps built on them, data will be the unsung hero of AR.
  - Geo-relevant data (store or product information) will be critical.
  - Object recognition data will let AR apps tap into previously chartered territory (area mapping), lessening the mobile compute burden for new AR experiences.
  - These data assets will be most effective if shared openly in a cloud repository.

- AR success will result from "native thinking." Build for the capabilities and limitations of the medium, rather than that of legacy formats (a classic pitfall of new technologies).
  - AR Success factors will also come from new modalities such as audio (sound "overlays").

- Attracting developers will be critical (between ARCore and ARkit, and from other sectors).
  - Due to mobile AR's capacity for scale, it will attract VR developers with transferable 3D design and modeling skills, or experience with game engines like Unity.
  - Yesterdays VR developers will be today's mobile AR developers and tomorrow's AR glasses developers – the ultimate AR endgame.

INSTALLED BASE OF ARCORE AND ARKIT

Global Handsets Compatible with ARCore or ARkit

Millions of Units

Year	Total	ARkit-Compatible iPhones	ARCore-Compatible Phones
2016	218.3	218.1	0.2
2017 (E)	505.2	433.7	71.5
2018 (E)	1,831	586.3	1,245
2019 (E)	3,248	653.8	2,594
2020 (E)	4,256	672.8	3,584

■ ARCore-Compatible Phones ■ ARkit-Compatible iPhones

Source: ARtillry Intelligence, 2017

Methodology

ARtillry follows disciplined best practices in market sizing and forecasting, developed and reinforced through 15 years in research and intelligence. Most of this time was spent in adjacent industries such as mobile, while the last two years has been spent in deeper and focused coverage of immersive computing (AR & VR). Forecasting principles, methodologies and best practices apply across these areas of market coverage.

This report specifically applies a bottom-up forecasting methodology that examines the unit sales and trajectory of AR-compatible smartphones to project future growth and penetration. Factors such as iOS and Android installed bases, unit-sales growth trending, hardware replacement cycles and OS-version upgrade cycles were key inputs.

More about ARtillry's market-sizing credentials can be found here:
http://www.mikebo.land/forecasting

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About ARtillry Insights
ARtillry Intelligence partners with the VR/AR Association to deliver a research package. Known as *ARtillry Insights*, it will equip subscribers in AR and VR sectors to make informed business decisions.

FEATURES
Original Research: Monthly original reports examining opportunities and dynamics of VR and AR.
Curated Research: ARtillry analysts collect, analyze and filter recommended reading and data.
Indexed Intelligence: Archived reports and multimedia assets, all in one place.

2017 EDITORIAL CALENDAR
June: The State of Virtual Reality (published)
July: Tech Giants Tackle AR (published)
August: VR Usage & Consumer Attitudes (published)
September: ARCore & ARkit: The Acceleration of Mobile AR (published)
October: Discussions & Takeaways from AR & VR Investors
November: When Will AR & VR Truly Arrive (forecast)
December: 2017's Biggest Lessons for AR &VR

COST
VR/AR Association Members: **$39/month**
Non-VR/AR Association Members: **$89/month**

https://youtu.be/WTruV4arTl0

ARtillry Insights: Gain a VR/AR Knowledge Position

About ARtillry

ARtillry is a publication and research firm that examines augmented reality (AR) and virtual reality (VR). Through writings, data and multimedia, it provides deep and analytical views into the industry's biggest players and opportunities. It's about insights, not cheerleading.

Run by career analyst and journalist Mike Boland, coverage is grounded in a disciplined and journalistic approach. It also maintains a business angle: Though fun and games permeate VR and AR (especially the former) long-term cultural, technological and financial implications are primary.

Learn more at **https://artillry.co/**

About Intelligence Briefings

ARtillry Intelligence Briefings are monthly installments of VR/AR data and analysis. They synthesize original and third-party data to reveal the dynamics of VR and AR sectors, and their opportunities.

In addition to data, a layer of insights is applied to translate market events and raw figures into prescriptive advice. This takes form in a narrative story arc, grounded in market figures.

Questions and requests for deeper analysis can be submitted at:
https://artillry.co/contact/

About the Author

Mike Boland was one of Silicon Valley's first tech reporters of the Internet age, as a staff reporter for *Forbes* (print) starting in 2000. He has been an industry analyst covering mobile and social media since 2005, and is now Chief Analyst of ARtillry, covering emerging tech.

Mike is a frequent speaker at industry conferences such as VRLA, ad:tech and LeadsCon. He has authored in-depth reports on the changing tech & media landscape including social networking and mobile. He contributes regularly to highly read online news sources such as *TechCrunch*, *Business Insider* and the *Huffington Post*.

A trusted source for tech journalists, his comments have appeared in A-list publications, including *The New Yorker*, *The Wall Street Journal* and *The New York Times*. Mike was previously a San Francisco-based journalist for business and technology print publications, such as *Red Herring*, *Business 2.0*, and *Mobile* Magazine.

Note of Disclosure

ARtillry has no financial stake in the companies mentioned in this report, nor received payment for its production. ARtillry's disclosure and ethics policy can be seen at:
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