



What Matters Now: 5G – Enabling Critical Technology Advancements

October 22, 2020

ARS Investment Partners, LLC

FIRM UPDATE – NEW HIRES

Sara Near – Business Development Associate

Tom Winnick – Director of Business Development

Nitin Sacheti – Portfolio Manager

RETURNING TO NORMAL TAKES TIME WITH PANDEMICS

Fifteen Large Pandemic Events with at least 100,000 Deaths

Event	Start	End	Deaths
Black Death	1347	1352	75,000,000
Italian Plague	1623	1632	280,000
Great Plague of Sevilla	1647	1652	2,000,000
Great Plague of London	1665	1666	100,000
Great Plague of Marseille	1720	1722	100,000
First Asia Europe Cholera Pandemic	1816	1826	100,000
Second Asia Europe Cholera Pandemic	1829	1851	100,000
Russia Cholera Pandemic	1852	1860	1,000,000
Global Flu Pandemic	1899	1923	1,000,000
Sixth Cholera Pandemic	1899	1890	800,000
Encephalitis Lethargica Pandemic	1915	1926	1,500,000
Spanish Flu	1918	1920	100,000,000
Asian Flu	1957	1958	2,000,000
Hong Kong Flu	1968	1969	1,000,000
H1N1 Pandemic	2009	2009	203,000

Source: FRBSF Paper "Longer-Run Economic Consequences of Pandemics", March 2020

DO POLITICS MATTER?

Presidents and the S&P 500: From 1932 to 2020

Party	# of Times	# of Years	Average Returns
Democratic	6	48	10.50%
Republican	7	39	6.90%

Source: Yardeni Research, September 28, 2020

THE THREE WAVES OF THE INTERNET

FIRST WAVE

1985 – 1999

Building the Internet

Laying the foundation for the online world.

DRIVEN BY:

People • Products • Platforms
Partnerships • Perseverance

MAJOR PLAYERS:

Cisco • IBM • Apple
America Online • Sprint
Sun Microsystems

SECOND WAVE

2000 – 2015

App Economy and Mobile Revolution

Search, social, and ecommerce startups grow on top of the internet.

DRIVEN BY:

People • Products • Platforms

MAJOR PLAYERS:

Amazon • Waze • Snapchat
Facebook • Google • Twitter

THIRD WAVE

2016 –

Internet of Everything

Ubiquitous connectivity allows entrepreneurs to transform major, real-world sectors.

DRIVEN BY:

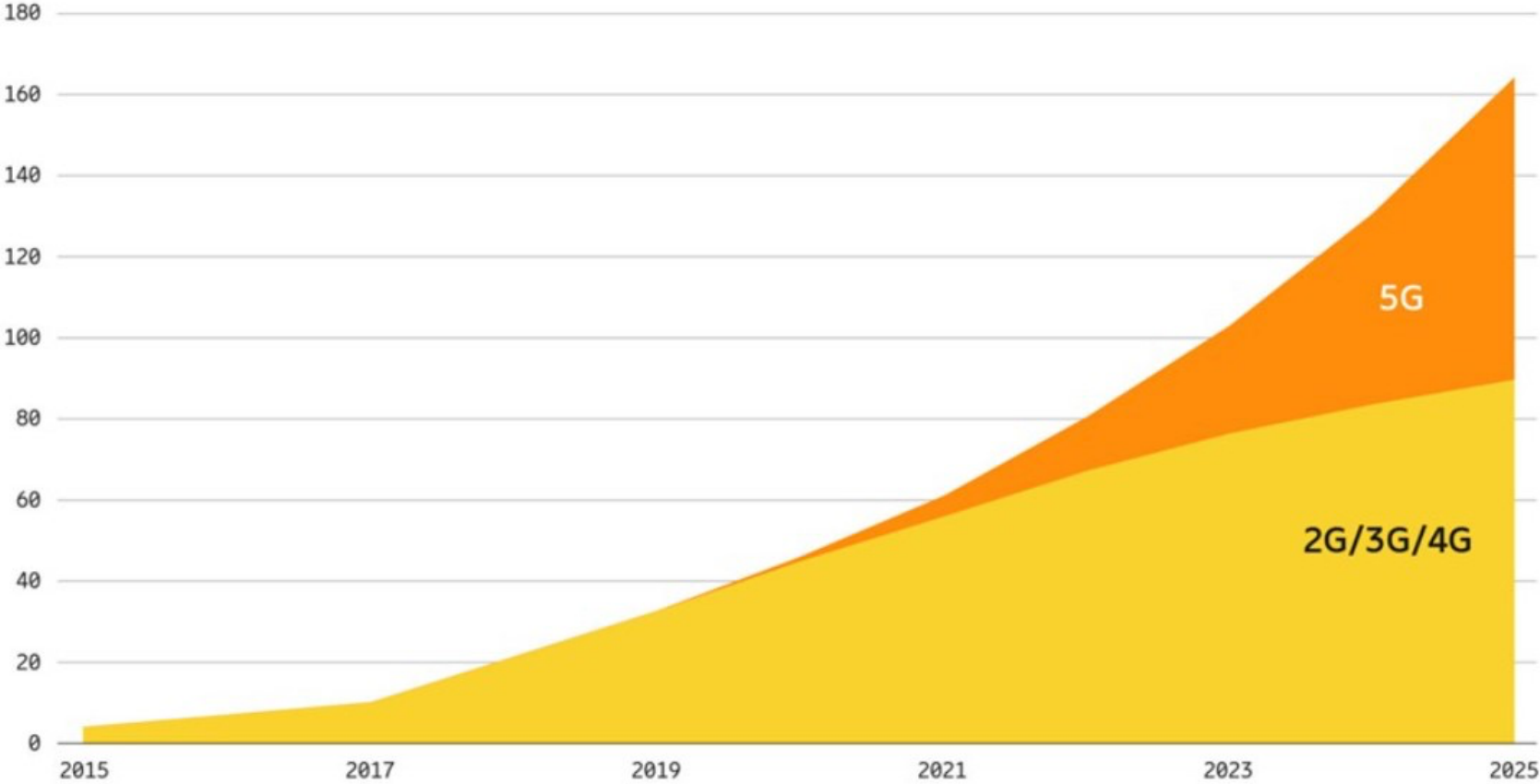
People • Products • Platforms
Partnerships • Policy • Perseverance

MAJOR PLAYERS:

TBD

Source: *The Third Wave: An Entrepreneur's Vision of the Future*, Steve Case.

BY 2025, 5G WILL ACCOUNT FOR ~45 PERCENT OF TOTAL MOBILE DATA

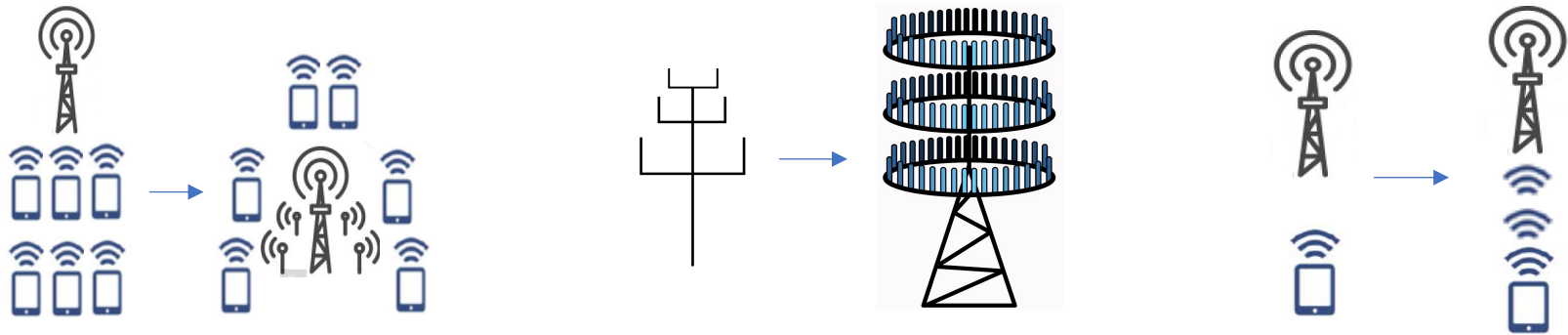


Source: Ericsson Mobility Report, June 2020.

5G IMPLEMENTATION AND OPPORTUNITIES



IMPLEMENTATION



OPPORTUNITIES

<p>CABLE</p> <p>Largest ground infrastructure for 5G backhaul and a regional monopoly in home broadband</p>	<p>GREENFIELD NETWORKS</p> <p>More efficient wireless networks built 'from a blank sheet of paper'</p>	<p>SEMICONDUCTOR INFRASTRUCTURE</p> <p>Demand for a broad set of chips from the brains of the phone to the voltage regulation of the tower</p>
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Our goal is to identify the winners with secular growth, barriers to entry and the ability to generate strong and predictable returns

CYBERCRIME REALITIES

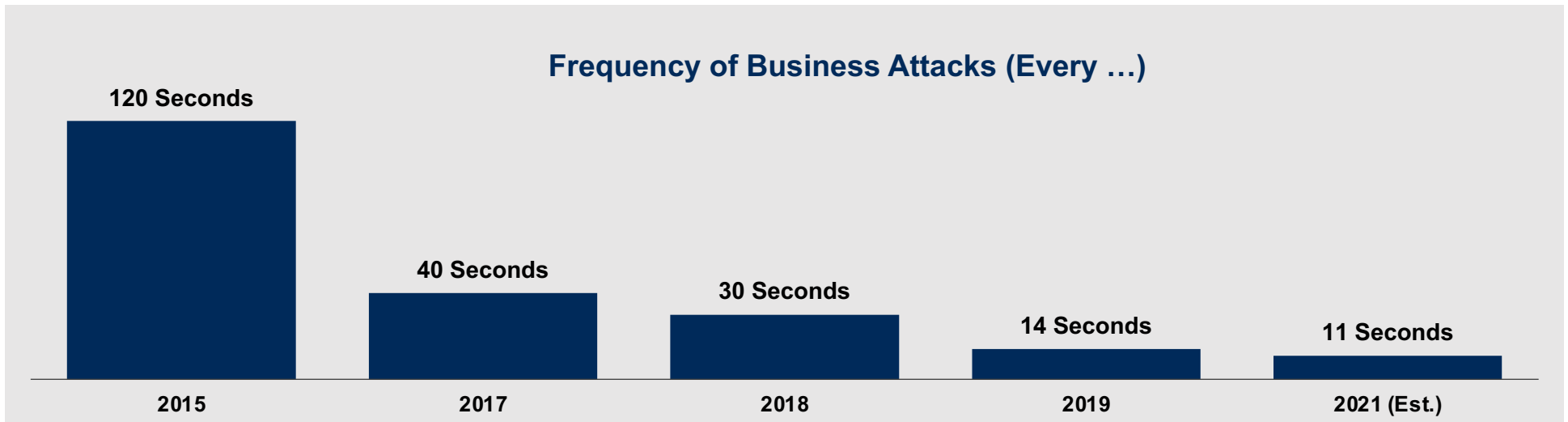
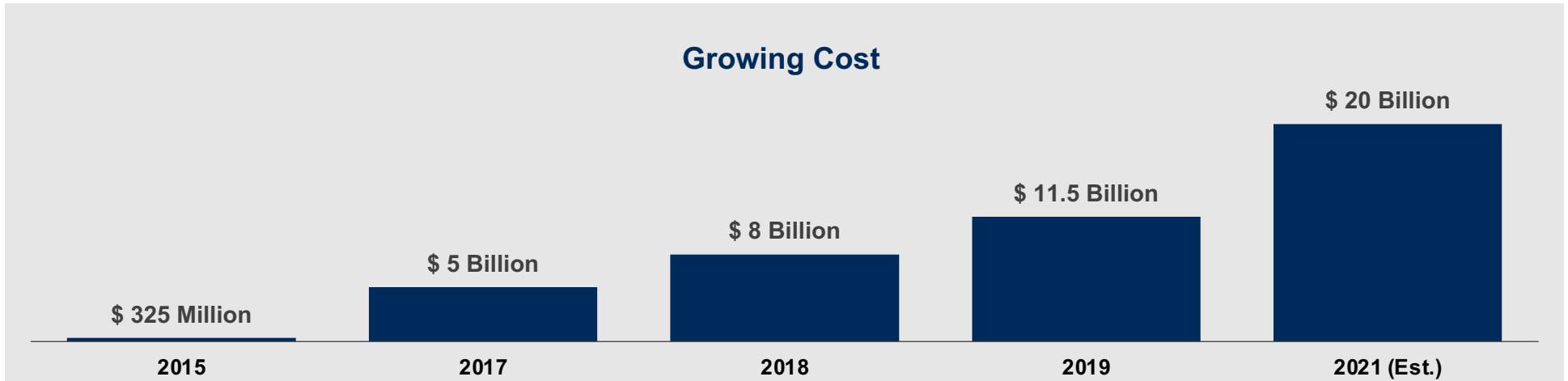
“I have never been to a company and looked at their network not to find it find it already breached and breached many times. The reality is the bad guy is already on your network.”

**Jeff B. Blount
Intrusion, Inc.
President & CEO**

“Every great security breach has one thing in common, everyone has had a firewall they were proud of.”

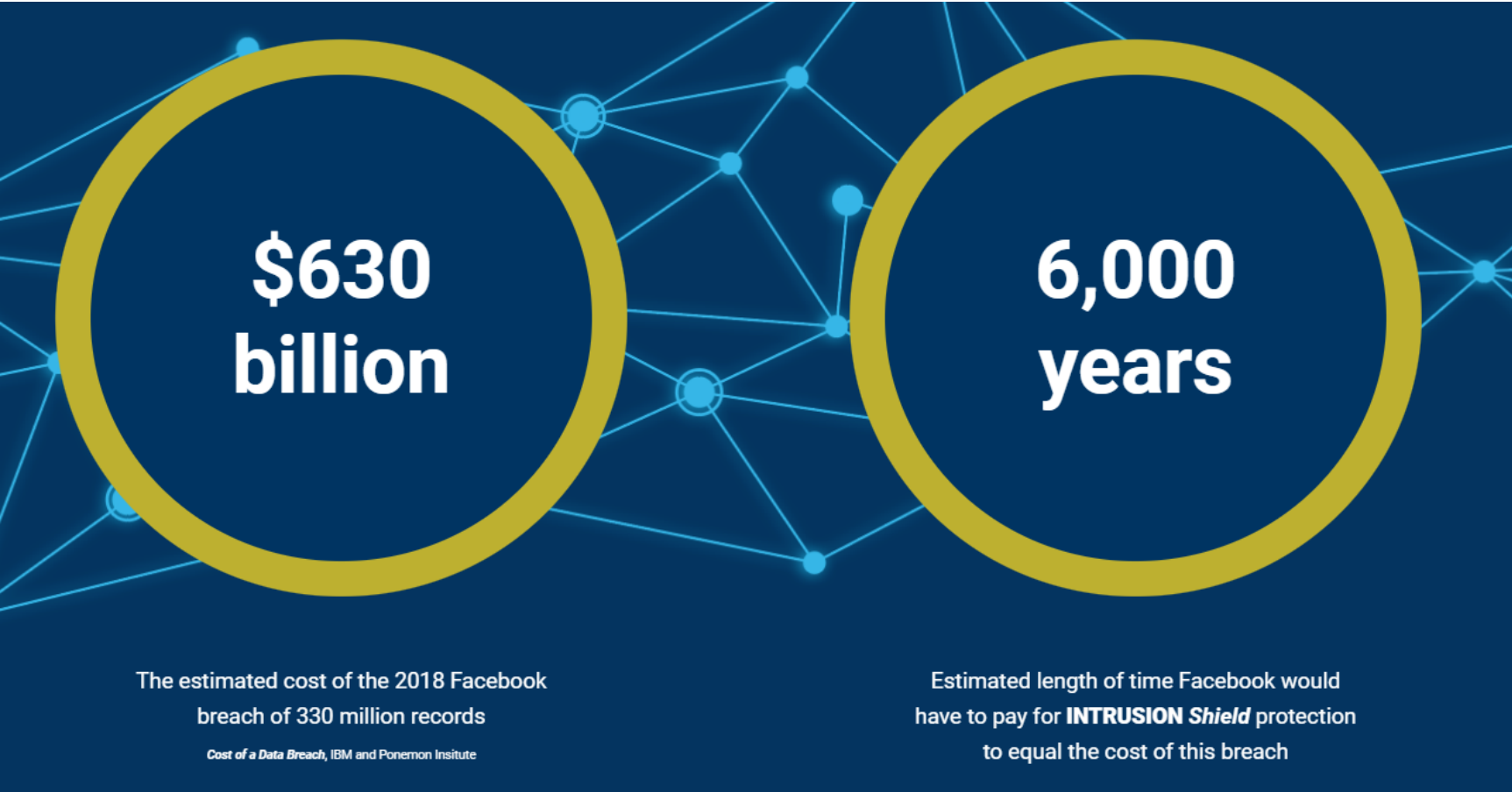
**Joe Head
Intrusion, Inc.
Co-Founder & SVP Strategic Programs**

RANSOMWARE ATTACKS



Source: Cybersecurity Ventures

A CASE STUDY: THE COST OF A DATA BREACH AND THE PRICE OF PROTECTION



Source: Intrusion

CHINA'S AMBITIONS AND FOCUS

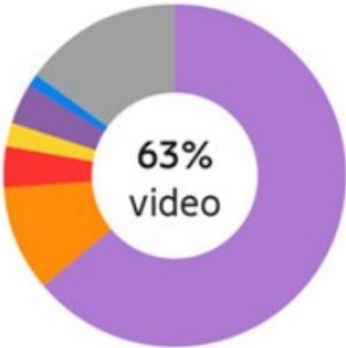
Ten Key Sectors Targeted Under the “Made in China 2025” Plan

- | | |
|---|---|
| 1. Next-Generation Information Technology | 6. Energy-Saving and New Energy Vehicles |
| 2. High-End Numerical Control Machinery and Robotics | 7. Electronic Equipment |
| 3. Aerospace and Aviation Equipment | 8. New Materials |
| 4. Maritime Engineering and High-Tech Maritime Vessel Manufacturing | 9. Biomedicine and High-Performance Medical Devices |
| 5. Advanced Rail Equipment | 10. Agricultural Machinery and Equipment |
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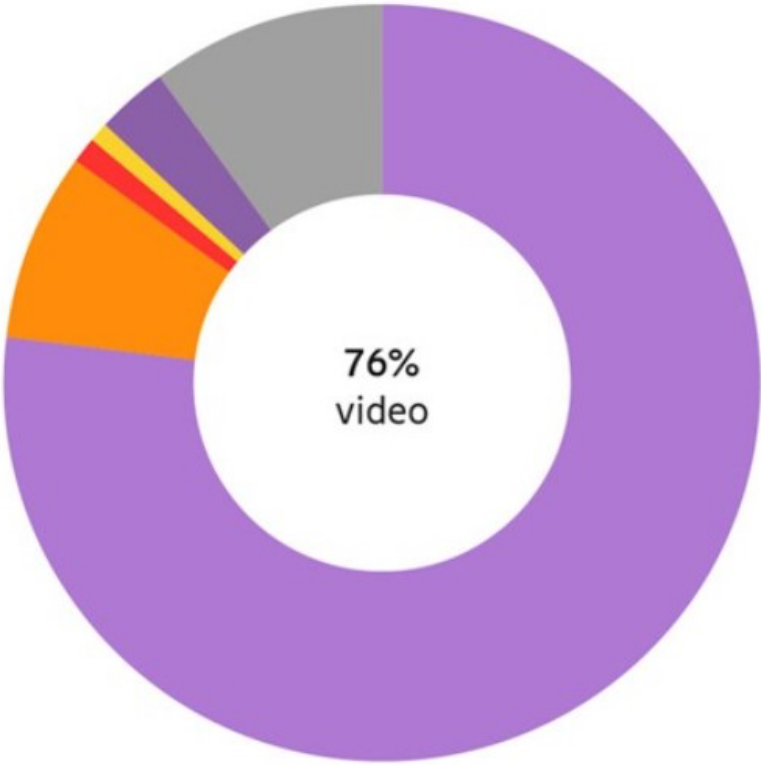
Source: US Chamber of Commerce.

MOBILE TRAFFIC BY CATEGORY

- Video
- Social networking
- Web browsing
- Audio
- Software download and update
- P2P file sharing
- Other segments



2019
33EB
per month



2025
164EB
per month

Source: Ericsson Mobility Report, June 2020.

THE THREE WAVES OF THE INTERNET

FIRST WAVE	SECOND WAVE	THIRD WAVE
1985 – 1999	2000 – 2015	2016 –
Building the Internet <i>Laying the foundation for the online world.</i>	App Economy and Mobile Revolution <i>Search, social, and ecommerce startups grow on top of the internet.</i>	Internet of Everything <i>Ubiquitous connectivity allows entrepreneurs to transform major, real-world sectors.</i>
DRIVEN BY: People • Products • Platforms Partnerships • Perseverance	DRIVEN BY: People • Products • Platforms	DRIVEN BY: People • Products • Platforms Partnerships • Policy • Perseverance
MAJOR PLAYERS: Cisco • IBM • Apple America Online • Sprint Sun Microsystems	MAJOR PLAYERS: Amazon • Waze • Snapchat Facebook • Google • Twitter	MAJOR PLAYERS: TBD

Source: *The Third Wave: An Entrepreneur's Vision of the Future*, Steve Case.

DISCLOSURE NOTES

Past performance is not indicative of future results

Definition of the Firm – ARS Investment Partners, LLC (ARS) was originally founded as A.R. Schmeidler & Co., Inc. in 1971 and is majority owned by Artemis US Corporation. Artemis US Corporation is 100% owned by Artemis Corporation, an Ontario, Canada entity, which is in turn 100% owned by Artemis Investment Management Corporation, a financial services firm headquartered in Toronto, Ontario, Canada. Mr. Miles Nadal is the controlling shareholder of Artemis Investment Management Corporation. ARS is a registered investment adviser under the Investment Advisers Act of 1940.

ARS Investment Partners, LLC claims compliance with the Global Investment Performance Standards (GIPS) and has prepared and presented this report in compliance with the GIPS Standards. ARS Investment Partners, LLC has been independently verified for the periods 12/31/99 through 12/31/16. The verification report(s) is/are available upon request. Verification assesses whether (1) the firm has complied with all the composite construction requirements of GIPS standards on a firm-wide basis and (2) the firm's policies and procedures are designed to calculate and present performance in compliance with GIPS standards. Verification does not ensure the accuracy of any specific composite presentation. Benchmark returns are not covered by the report of independent verifiers. Management believes that the returns prior to 2000 are accurate, but due to a lack of firm wide client data, GIPS compliance cannot be claimed prior to 1/1/2000.

Benchmark Definition – Russell 3000 is a stock index consisting of the 3000 largest publicly listed U.S. companies, representing about 98% of the total capitalization of the entire U.S. stock market. The S&P 500 is an index of 500 stocks chosen for market size, liquidity and industry grouping, among other factors. The S&P 500 is designed to be a leading indicator of U.S. equities and is meant to reflect the risk return characteristics of the large cap universe. Companies included in the index are selected by the S&P Index Committee, a team of analysts and economists at Standard & Poor's. The S&P 500 is a market value weighted index — each stock's weight is proportionate to its market value. The S&P 500 w/ dividends index was discontinued by IDC (who supplies our index data) in December 2015. Thus, we switched to the S&P 500 Total Return index in all areas that we previously used the S&P 500 w/ dividends. The change was applied retroactively. Index information is provided for illustrative purposes only. Indices are unmanaged, do not incur expenses and are not available for direct investment. The Russell 2000 is comprised of the smallest 2000 companies in the Russell 3000 Index, representing approximately 8% of the Russell 3000 total market capitalization.

Composite Definition – The Focused All-Cap Composite includes all actual fee-paying, discretionary institutional portfolios managed by the Firm in an all cap equity strategy with an absolute return-oriented focus having a minimum initial portfolio size of \$5 million (amount lowered from \$10 million on 7/1/2010). The all cap equity strategy requires that equity, equity-like securities, and cash represent a target 90% of the portfolio value. If a portfolio does not have at least a target of 90% of its value in these assets, the portfolio will be removed from the composite for the entire period and will be included in the composite again if its allocation is aligned with the above stated objectives for one full period. The Composite was created in January 2007. Effective 7/1/2010 the composite was redefined to include taxable accounts which had previously been excluded. In January 2017, the composite name was changed from Multicap Equity. ARS Core Equity (WRAP) Composite includes a discretionary institutional portfolio managed by the Firm, and invests in companies with above-average dividend yields and strong balance sheets, typically with clear prospects for dividend growth. For all periods presented, the Composite is made up of 100% WRAP portfolios, which may include, but is not limited to broker fees, investment advisor fees, custodian fees and administrative fees. The composite was created in October 2011. In January 2017, the composite name was changed from Dividend Wrap.

Investment Management Fees – The investment management fees that apply to the portfolio composites are as follows: Equity Accounts – 1.25% per annum of the first \$1 million and 1.00% per annum of the next \$20 million and to be discussed thereafter; ARS Core Equity (WRAP) Account – 1.00% per annum. The management fees for certain clients may differ from the above schedule because those clients' fees are grandfathered or because of relationships with the applicant or other accounts. For institutional accounts, certain asset or fee minimums may apply.

Internal Dispersion Internal dispersion is calculated using the asset-weighted standard deviation of annual returns of all portfolios in the composite for the entire year. Dispersion is not presented for periods less than

one year or when there were five or fewer portfolios in the composite for the entire year. The Annualized 3-Year Standard Deviation is not presented for composites with less than a 36-month return. Also, the standard deviation is not presented and not is required, for periods prior to 2011.

Basis of Presentation – Rates of return presented are computed using a time-weighted rate of return methodology that adjusts for external cash flows. Total rate of return calculations include realized and unrealized gains and losses, plus income, and cash and cash equivalents held. Gross performance returns are presented after transaction costs and before investment management fees and all operating costs. Net performance returns are presented after transaction costs and actual investment management fees and before all operating costs. However, gross performance for the ARS Core Equity (WRAP) Composite is presented as pure gross and net performance is actual investment management fees and after all operating costs and the gross returns are presented as supplemental information. Operating costs include custodian and administrative fees. Additional information regarding policies for valuating portfolios, calculating performance, and preparing compliant presentations are available upon request. Performance results for periods of less than a year are not annualized. Past performance is not indicative of future results.

Composite Construction Accounts are included at the beginning of the first full calendar month the account is under management. In all composites, portfolios that initially do not qualify for the minimum threshold are later included if their asset size increases above the minimum requirement for one full period, defined as one month. Any account crossing over the composite's minimum threshold shall be included in the composite at the start of the subsequent month it increased in market value. Accounts are excluded at the end of the last full month the account is under management or fails to meet the composite definition. Portfolios that initially qualify and fall below the minimum due to market fluctuations will not be removed from the composite. Accounts are switched from one composite to another when there are changes in client circumstances that result in changes in investment goals and objectives. Accounts are not omitted from the performance calculation for a month during the switch. ARS Investment Partners, LLC implements the following rule for switching accounts: If the account switched composites during the month, it will exit its former composite at the end of the month the switch occurs, and enter the new composite the following month. The standard performance measurement period is monthly. Composite rates of return are calculated on a monthly basis by asset market weighting the constituent portfolio returns within the composite using beginning-of-period market value weightings. Performance returns are in U.S. Dollars. Periodic returns are geometrically linked. The composite rates of return have been calculated within ARS Investment Partners, LLC. A complete list and description of the composites managed by ARS Investment Partners, LLC is available upon request.

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Composite performance is shown gross of fees. The historical index performance results are provided exclusively for comparison purposes only. It is not possible to invest directly in an index. It should not be assumed that any account holdings will correspond directly to any comparative index reflected herein. The information contained herein (1) is proprietary to Informa Enterprise Solution PSN and/or its content providers; (2) may not be copied or redistributed; and (3) is not warranted to be accurate, complete, or timely. Other data provided may be based upon information received from third parties which is believed to be accurate, but no representation is made that the information provided is accurate and complete. Please be sure to refer to your custodial account statement(s) as the true and accurate record of your portfolio holdings and transactions.

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