

11 Dec 2020 00:00:00 ET | 16 pages

Semiconductor Equipment
North America | United States

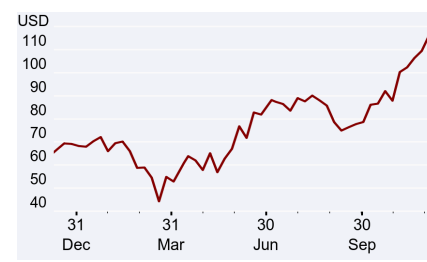
Teradyne Inc (TER)

Takeaways from Video call on Industrial Automation

- **What's New** – We hosted Mark Jagiela (CEO) and Andrew Blanchard (VP of IR) of Teradyne for a video call on Industrial Automation as part of Citi's Megatrends series. Overall the tone of the call was positive. The early part of 2020 was difficult for industrial automation, however, the more recent acquisitions in mobile robots and AutoGuide will see growth in 2020, with a contraction in UR in 2020 and return to growth in 2021.
- See detailed notes on page 3.

Buy	1
Price (10 Dec 20 16:00)	US\$115.68
Target price	US\$107.00
Expected share price return	-7.5%
Expected dividend yield	0.3%
Expected total return	-7.2%
Market Cap	US\$19,209M

Price Performance (RIC: TER.O, BB: TER US)



EPS (US\$)	Q1	Q2	Q3	Q4	FY	FC Cons	VA Cons
2019A	0.54A	0.66A	0.79A	0.88A	2.86A	2.86A	2.84A
2020E	1.04A	1.33A	1.17A	0.98E	4.51E	4.50E	4.51E
Previous	1.04A	1.33A	1.17A	0.98E	4.51E	na	na
2021E	1.00E	1.29E	1.27E	1.12E	4.68E	4.84E	4.71E
Previous	1.00E	1.29E	1.27E	1.12E	4.68E	na	na
2022E	1.13E	1.37E	1.52E	1.41E	5.42E	5.35E	5.17E
Previous	1.13E	1.37E	1.52E	1.41E	5.42E	na	na

Source: Company Reports and dataCentral, Citi Research. FC Cons: First Call Consensus. VA Cons: Visible Alpha Consensus.
Click [here](#) for Visible Alpha consensus data

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TER.O: Fiscal year end 31-Dec						Price: US\$115.68; TP: US\$107.00; Market Cap: US\$19,209m; Recomm: Buy					
Profit & Loss (US\$m)	2018	2019	2020E	2021E	2022E	Valuation ratios	2018	2019	2020E	2021E	2022E
Sales revenue	2,101	2,295	3,073	3,122	3,436	PE (x)	48.7	40.4	25.6	24.7	21.3
Cost of sales	-880	-955	-1,321	-1,292	-1,423	PB (x)	14.2	14.5	9.9	7.2	5.4
Gross profit	1,220	1,340	1,751	1,830	2,014	EV/EBITDA (x)	48.6	40.3	22.8	20.2	16.4
Gross Margin (%)	58.1	58.4	57.0	58.6	58.6	FCF yield (%)	1.7	2.2	3.5	3.9	4.1
EBITDA (Adj)	371	458	805	875	1,033	Dividend yield (%)	na	na	na	na	na
EBITDA Margin (Adj) (%)	17.7	20.0	26.2	28.0	30.1	Payout ratio (%)	0	0	0	0	0
Depreciation	-113	-121	-125	-121	-121	ROE (%)	26.0	31.8	41.1	30.7	26.6
Amortisation	0	0	0	0	0	Cashflow (US\$m)					
EBIT (Adj)	528	580	929	995	1,154	EBITDA	602	660	1,023	1,091	1,249
EBIT Margin (Adj) (%)	25.1	25.3	30.3	31.9	33.6	Working capital	-165	-51	-52	-55	-139
Net interest	-6	-13	-22	-24	-24	Other	38	-31	-96	-110	-134
Associates	0	0	0	0	0	Operating cashflow	475	579	875	926	976
Non-Op/Except/Other Adj	-54	-26	-33	-25	-25	Capex	-114	-135	-175	-125	-137
Pre-tax profit	468	541	874	946	1,105	Net acq/disposals	-169	-80	1	0	0
Tax	-16	-62	-121	-147	-171	Other	1,207	58	-146	0	0
Extraord./Min.Int./Pref.div.	0	0	0	0	0	Investing cashflow	923	-157	-321	-125	-137
Reported net profit	452	479	753	800	934	Dividends paid	0	0	0	0	0
Net Margin (%)	21.5	20.9	24.5	25.6	27.2	Financing cashflow	-836	-513	-96	0	0
Core NPAT	449	498	778	821	955	Net change in cash	564	-92	457	801	838
Per share data						Free cashflow to s/holders					
Reported EPS (\$)	2.39	2.75	4.37	4.56	5.30		361	444	700	801	838
Core EPS (\$)	2.37	2.86	4.51	4.68	5.42						
DPS (\$)	0	0	0	0	0						
CFPS (\$)	2.51	3.32	5.08	5.28	5.54						
FCFPS (\$)	1.91	2.55	4.06	4.57	4.76						
BVPS (\$)	8.13	7.97	11.64	16.15	21.39						
Wtd avg ord shares (m)	189	170	168	166	166						
Wtd avg diluted shares (m)	189	174	172	175	176						
Growth rates											
Sales revenue (%)	-1.7	9.2	33.9	1.6	10.1						
EBIT (Adj) (%)	-7.2	9.8	60.3	7.1	15.9						
Core NPAT (%)	-4.2	11.0	56.2	5.5	16.3						
Core EPS (%)	1.5	20.5	57.7	3.7	15.8						
Balance Sheet (US\$m)											
Cash & cash equiv.	1,117	911	1,462	2,208	2,990						
Accounts receivables	291	362	588	628	729						
Inventory	154	197	166	176	205						
Net fixed & other tangibles	379	491	554	600	658						
Goodwill & intangibles	507	542	539	539	539						
Financial & other assets	259	293	310	324	358						
Total assets	2,707	2,796	3,619	4,474	5,480						
Accounts payable	101	127	148	157	183						
Short-term debt	0	0	0	0	0						
Long-term debt	380	395	406	406	406						
Provisions & other liab	704	783	886	886	886						
Total liabilities	1,184	1,305	1,440	1,450	1,476						
Shareholders' equity	1,522	1,492	2,179	3,024	4,004						
Minority interests	0	0	0	0	0						
Total equity	1,522	1,492	2,179	3,024	4,004						
Net debt (Adj)	-737	-517	-1,056	-1,801	-2,584						
Net debt to equity (Adj) (%)	-48.4	-34.6	-48.5	-59.6	-64.5						

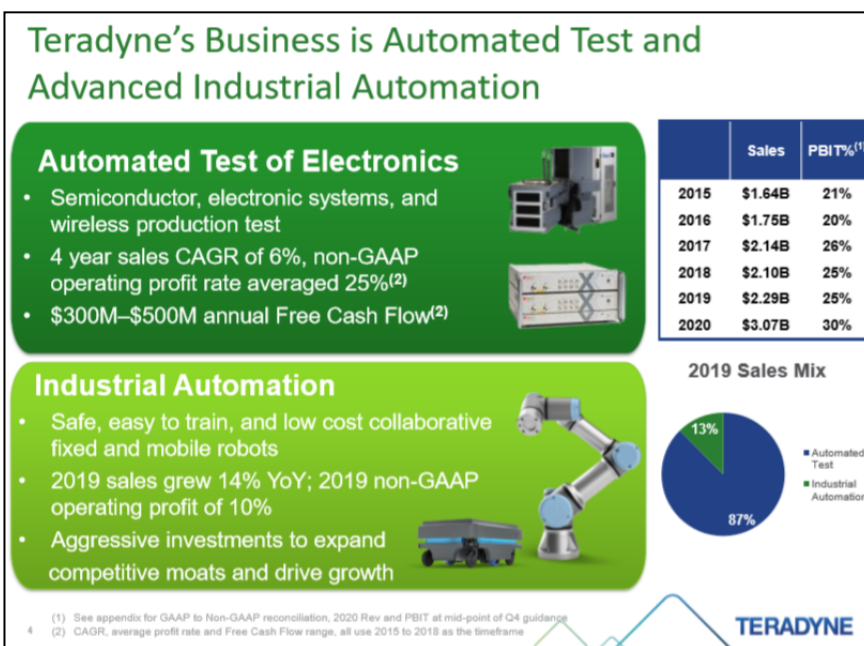
For definitions of the items in this table, please click [here](#).

Takeaways from Video Call on Automation

Overview

Semiconductor test represents the majority of the revenue for 2020 and is a very technical business with 2 suppliers, Teradyne and Advantest. There is also system level test that has emerged as a high growth business – HDD and system level semi test which is a new device test. Wireless test and military/aerospace are additional areas of test.

Figure 1. Teradyne Product Overview



Industrial Automation

- Safe, easy to train, and low cost collaborative fixed and mobile robots
- 2019 sales grew 14% YoY; 2019 non-GAAP operating profit of 10%
- Aggressive investments to expand competitive moats and drive growth



2019 Sales Mix

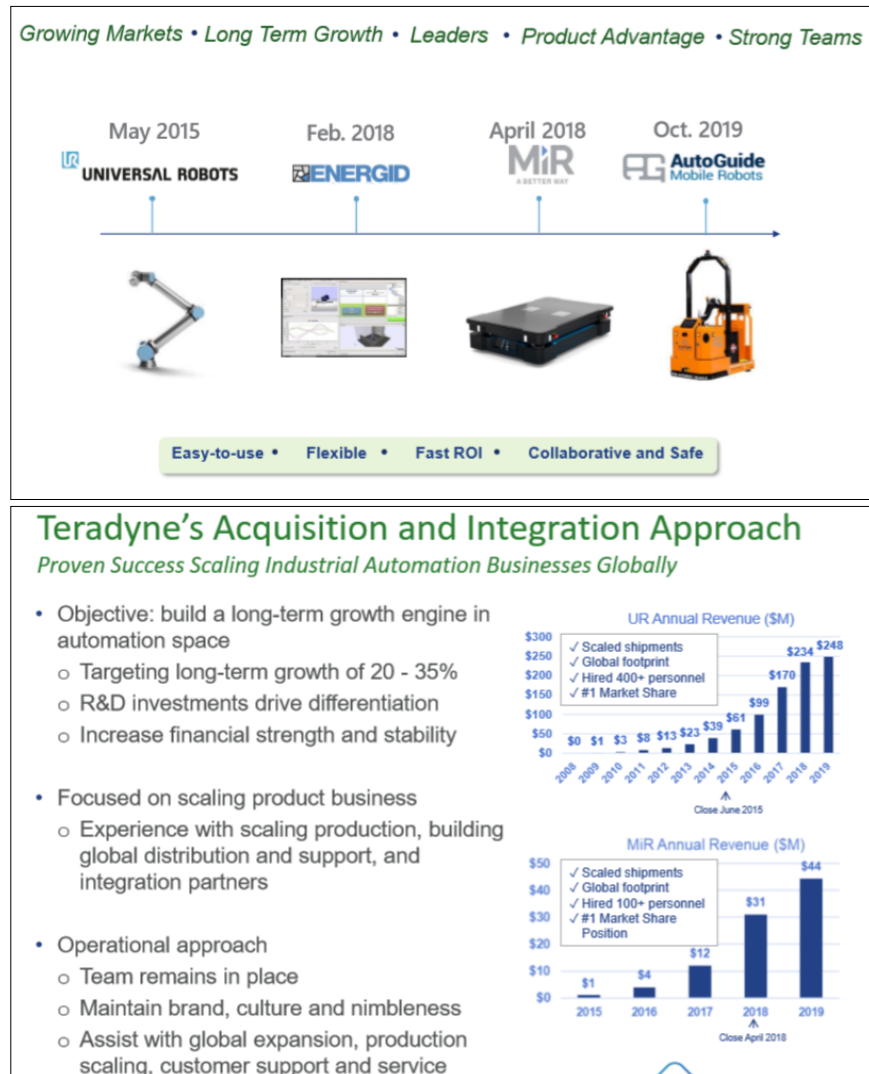


Category	Percentage
Automated Test	87%
Industrial Automation	13%

Source: Teradyne

Industrial automation is an emergent market that Teradyne has expanded into. Most acquisitions in the past 4 to 5 years have been in this space and Teradyne will continue to remain active in the M&A market for industrial automation. The early part of 2020 was difficult for industrial automation, however the more recent acquisitions in mobile robots and AutoGuide will see growth in 2020, expect to see a contraction in UR in 2020 with a return to growth in 2021. The reason to enter the industrial automation markets was that management thought that the secular growth in test was going to be about a 5-6% growth rate in electronics, however, that growth rate has been closer to 8-9% and industrial automation growth has surprised as well.

Figure 2. Teradyne IA Acquisition History & Integration Approach



Source: Teradyne

Payback time on UR products is about 10.5 months – ASPs have stabilized and in some cases grown as the value proposition is strong. ROIs on MiR are also under a year, for AutoGuide are over a year, but there is a value proposition around safety as forklift accidents are a common cause for injury in factories.

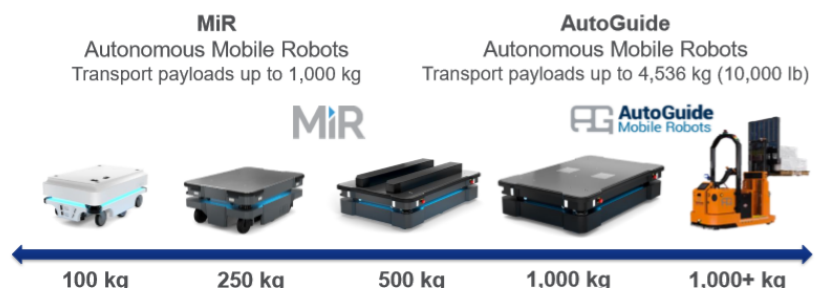
Figure 3. Universal Robot (UR), MiR, & AutoGuide Overview



- Easiest to train collaborative robot
 - Intuitive software for easy training and deployment
 - Short deployment time saves cost and increases distribution channel capacity
- Broadest distribution network
 - Global network of distributors and certified integrators
 - Expanding geographic and end-market coverage
- UR+ ecosystem of 3rd party technology partners
 - Open architecture leverages 3rd party IP
 - Over 250 certified peripherals fully integrated into the UR hardware and software environment
 - End of arm "hands" for gripping, welding, polishing and more
 - Vision, sensing, and motion control apps expand use cases



Safe, Productive Autonomous Mobile Robots for the Low and High Payload Material Handling Markets

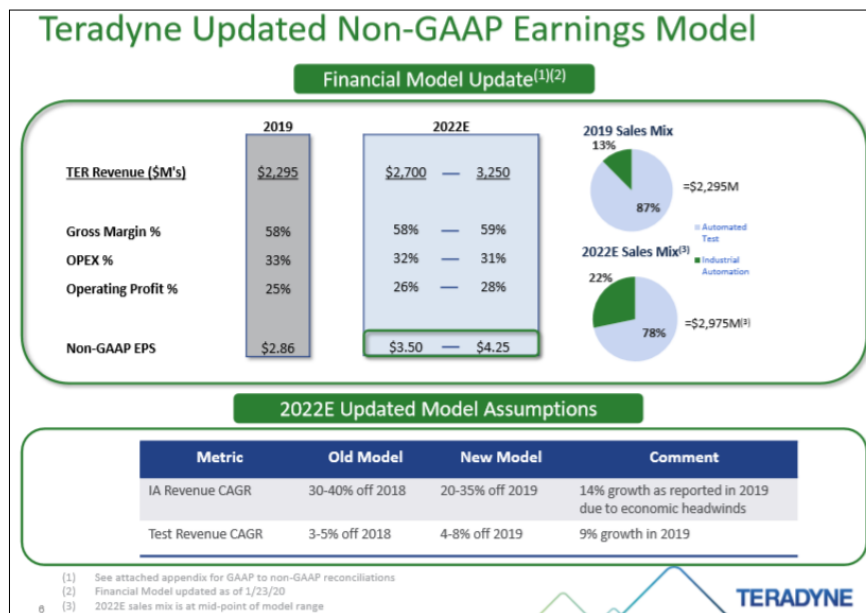


- Address all product categories of autonomous mobile transport for industrial, warehouse logistics and related markets
- Differentiation through advanced sensor, navigation, and drive technologies
- Fleet management software controls dispatch, charging, and route planning

Source: Teradyne

Teradyne will update the financial target model during the January earnings call; management continues to be conservative in the forecast and surprised by the robustness in the semi test business and expect that growth in industrial automation coming out of the pandemic will continue to be around 20%.

Figure 4. Teradyne Current Financial Model



Source: Teradyne

Q&A Segment

1. What is driving recovery in IA?

The shutdown of manufacturing in North America and Europe in March and April had a negative impact, but since then there has been a return to growth particularly in North America, in fact they expect to see growth in North America in 2020. Collaborative robots are more important now – there are rolling shutdowns and social distancing that are motivating factors on top of just using robots for repetitive tasks. China has also started to see growth. Europe has been the slowest to return to growth. There is a concern around another wave, but not seeing manufacturing shutdowns yet, but if there is a return there could be a slowdown in robotics.

2. What are the swing factors in IA growth?

AutoGuide is the one that can inflect the most and the quickest – converting a few large forklift customer in e-commerce, logistics, or big box stores. AutoGuide could potentially grow triple digits even with the conversion of just 1 customer. Sales cycles are longer. With AutoGuide there is a \$30B forklift market and Teradyne can address \$8-10B of that market. MiR customer portfolio is moving much larger fleets, customers today are moving closer to 20-30 robots versus in the past 2-5.

3. What is the market for Cobots today – IFR says 18k?

18k units is probably a little low, UR alone is well over 10k and the ASPs depending on the model range between \$20-40K. There has been no compression in the pricing, if anything ASP have expanded over the past 5 years. However, in China for the past 3 years, most of the Chinese cobot manufacturers are having a very competitive price dynamic – but it is bifurcated, there is a market that is more price sensitive and goes with the lower cost Chinese market, and then there is a market that is more focused on safety and ease of programming that are using UR. Teradyne is not going after the low end market. UR's market share is around 50%.

4. How are you expanding into new markets?

Most of the new market openings for cobots has come from opening up the platform for innovation on attachments. Focused on lifting and moving capabilities along with intelligence. Intelligence is key with the ability to deploy robotics quickly with an understanding of the environment with the ability to adapt to environment changes. A lot of the success is from development partners.

5. How strategic is Industrial Automation?

The fact that they moved Greg Smith from test to IA is a show of importance. Teradyne created the world of automation with test in semis and have been working along that curve. There is a latent opportunity in automating manufacturing. Need a blended growth rate above 10% to be attractive company. Semi test is a mature business and will be difficult to grow above high single digits, so the emergent market of industrial automation brings that growth portfolio to the company so it is clearly very strategic.

6. Profitability scale with revenue?

As long as they are growing within the target growth rate they are not going to optimize the profitability. More concerned around gross margins and maintaining the high 50% range, once the growth rate slows the high growth margins will help them run the business and profit will accelerate. It is still a nascent market so modeling it in 5-15% bottom line profitability as they grow.

7. Competition dynamics versus larger robotics companies and startups?

In 2015 all the large robotics companies had collaborative robots and were inferior to what UR had and there were also some startups. Today, those same large industrial robotics companies are on their 2nd generation of collaborative robots and still deciding if it is a market that will matter to them since the business model is very different. Don't see a significant competitive difference today versus 2015 from the large players. On the startup side there are about 4x the number of competitors, with only maybe 1 company that is still around from 2015, there have been many that have come and gone along the way. Many of the new startups today are out of China and compete on price and reduced capabilities to focus on a specific task for a specific Chinese market. Will continue to see emergent players, but Teradyne will remain ahead on both distribution and development partnerships.

8. What inning are we in building out distribution?

Don't think that the growth will be largely through acquisitions, the platforms today have the ability to grow 20-35%. The distribution capability of UR is pretty robust and now it is about getting more velocity in the channel. AutoGuide is just launched in Europe, there is a lot more distribution expansion that will fuel growth. MiR is somewhere between UR and AutoGuide in terms of expansion opportunities. The acquisitions going forward are technology enhancements that can bring competitive advantages that are hard to replicate (i.e. intelligence). Don't need additional product platforms – expand services, expand the ability for the robots to be more adaptive.

9. Ecosystem barriers to entry in terms of peripherals?

If you look at what makes a smartphone interesting it is the apps – 3rd parties won't develop apps on fringe operating systems. The same is happening on the collaborative robots, developers are focused on developing peripherals for UR and might be interested in one other platform if there is a significant growth opportunity. The engineering investment in UR is probably more significant outside of Teradyne.

10. Geographic breakdown?

Europe is the #1 market, and North America has been rapidly outgrowing Europe over the past few years and is poised to overtake Europe as the #1. China has been growing more rapidly than both but it is a smaller base and is #3. The rest of Asia is more slowly developing.

11. COVID-19 Opportunity for Cobots?

Early on saw a tremendous surge for Mobile Robots for medical. Adding a UV disinfectant that would go around an office. That has gone back to normal levels. There has been demand for hospitals principally in China – bringing medical supplies around a hospital. But not seeing disproportional growth in medical, but social distancing has been a general theme as to why companies are buying cobots.

12. Semi supply chain – any constraints?

Earlier in the year saw some supply tightness, today it is much better than it was 6 months ago. If there are bottlenecks it is not in areas where you might expect – it is in areas like cables and other areas that take manual building, whereas sophisticated electronics are not seeing any bottlenecks.

Teradyne Inc

Company description

Teradyne Inc. (TER) is a leading provider of automated test equipment (ATE) and services for the electronics and communications industry. The company has four operating segments: Semiconductor Test, Wireless Test or LitePoint, Systems Test, and Industrial Automation. The Semiconductor Test division offers test equipment and services used for wafer level and device package testing for a range of devices including SoCs, memory, analog, RF and logic devices sold into the automotive, communications, consumer, computing and industrial markets. Customers include integrated device manufacturers (IDMs), outsource assembly and test companies (OSATs), wafer foundries, and fabless design companies. The company's Systems Test Group provides circuit board test, military and aerospace test, and hard disk drive test products and services. Wireless test group was added through LitePoint acquisition in 2011. It includes both connectivity and cellular test applications. Industrial automation was added through Universal Robots acquisition in 2015. Teradyne was founded in 1960 and is headquartered in North Reading, Massachusetts, with manufacturing, service, and sales facilities throughout the United States, Europe, and Asia.

Investment strategy

We rate TER shares Buy. We believe increasing 5G and industrial automation appeal will help drive the stock multiple higher over time.

Valuation

We value TER at \$107 using sum of the parts valuation method. We assign \$77/sh value to semiconductor test biz (20x P/E peer Advantest times C22 semitest EPS power), \$18/sh value to automation biz (39x P/E peer Fanuc times C22 automation EPS power), \$5/sh to system test (15x P/E peer HDD stocks times C22 system test EPS power), \$3/sh to wireless test (20x P/E peer KEYS times C22 wireless test EPS power) plus \$4 net cash/sh.

Risks

Risks we see to the stock achieving our target price include the following: 1) TER has heavy exposure to the cyclical semiconductor industry, which typically has limited visibility and a high degree of uncertainty regarding the timing and duration of cycles. 2) As fab utilization and capital equipment orders are closely linked to stock price, any material differences to our supply/demand model (e.g., demand drops suddenly, or supply increases more rapidly than we predict) may cause our valuation methodology to be inaccurate. 3) TER's principal market, semiconductor test equipment, is highly competitive and seeing its revenue opportunity decline from cyclical peak to peak, in our opinion. The industry has experienced some consolidation, which should help drive a more rational pricing environment. However, should we see a protracted down cycle, significant pressure on pricing is exacerbated by the competitive pricing from smaller competitors could impair TER's profitability. 4) Share loss is possible in the highly competitive wireless test market. Conversely, if TER sees a faster-than-expected acceleration in mix shift toward its new semi-test product cycle or higher share gains in wireless, or if further consolidation in the semi test space leads to more rational pricing, there could be upside risk to the stock.

Appendix A-1

Analyst Certification

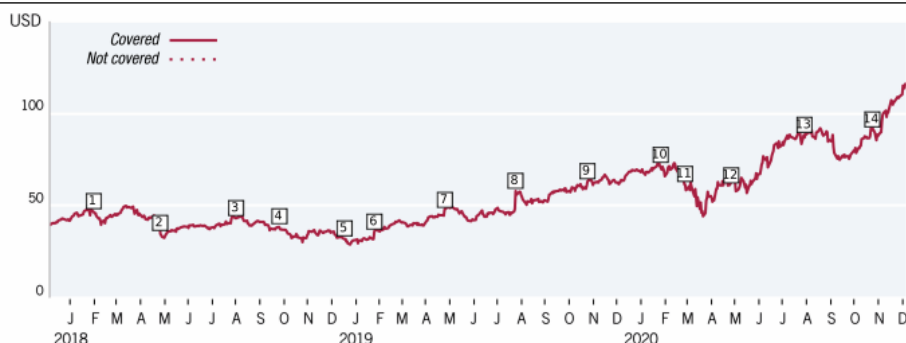
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Teradyne Inc (TER)

Ratings and Target Price History
Fundamental Research

Analyst: Atif Malik



	Date	Rating	Target Price	Closing Price
1	29-Jan-18 16:36:48	1	*\$54.00	46.86
2	25-Apr-18 22:25:10	1	*\$45.00	34.70
3	31-Jul-18 14:47:31	1	*\$51.00	43.25
4	24-Sep-18 01:02:14	1	*\$47.00	38.45
5	17-Dec-18 05:06:59	1	*\$41.00	31.80

*Indicates Change

	Date	Rating	Target Price	Closing Price
6	24-Jan-19 19:03:23	1	*\$43.00	36.04
7	24-Apr-19 15:26:40	1	*\$53.00	47.99
8	24-Jul-19 20:12:04	1	*\$66.00	57.94
9	24-Oct-19 17:53:28	1	*\$73.00	63.11
10	24-Jan-20 01:47:47	1	*\$90.00	72.10

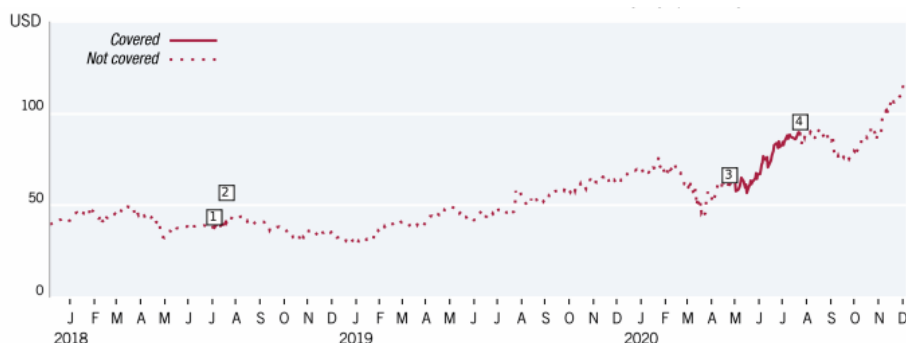
	Date	Rating	Target Price	Closing Price
11	25-Feb-20 13:25:10	1	*\$83.00	61.63
12	23-Apr-20 06:49:55	1	*\$72.00	61.20
13	27-Jul-20 01:07:14	1	*\$89.50	88.32
14	22-Oct-20 06:37:59	1	*\$107.00	90.94

Rating/target price changes above reflect Eastern Time

Teradyne Inc (TER)

Catalyst Watch Research

Analyst: Atif Malik



	Date	Expected Direction	Duration	Closing Action Price
1	03-Jul-18 00:56:58	Upside	30 Days	Open 37.82
2	18-Jul-18 00:50:38	Upside	30 Days	Close 41.38

	Date	Expected Direction	Duration	Closing Action Price
3	23-Apr-20 06:49:55	Downside	90 Days	Open 61.20
4	22-Jul-20 16:15:45	Downside	90 Days	Close 89.49

Rating/target price changes above reflect Eastern Time

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<i>Data current as of 30 Sep 2020</i>	12 Month Rating			Catalyst Watch		
	Buy	Hold	Sell	Buy	Hold	Sell
Citi Research Global Fundamental Coverage	55%	34%	11%	22%	68%	9%
<i>% of companies in each rating category that are investment banking clients</i>	65%	62%	59%	68%	62%	68%

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