

TRIUMPH GROUP, INC.

Coupon: 7.750%

Maturity Date: 8/15/2025

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EXECUTIVE SUMMARY

Triumph Group is a globalwide supplier of aerospace services, structures, systems and support. Triumph does not have significant concentration in this industry as compared to other major players according to their revenue. Triumph has performed poorly in the past few years given that Triumph is the only company that experienced net loss in 2018, compared to its top competitors. Due to this net loss, both return on assets and equity are negative, while the industry average is positive. In addition, its interest coverage, which is a company's ability to pay back debt, is negative. Triumph also operates with high debt-to-equity ratio.

In August 15, 2017, Triumph issues a senior unsecured bond with 7.750% coupon rate that matures on August 15, 2025. In July 2018, this bond has been rated Caa and CCC+ by Moody's and Standard & Poor's, respectively. This bond is callable at any date before maturity at certain prices. The following yields are calculated based on assumption that settlement date is Tuesday, March 12, 2019. If this bond is called at the earliest date possible, the yield is 16.929%. If this bond is held to maturity, the yield is 8.511%. Triumph is highly unlikely to call the bond before maturity due to high yield, which means high borrowing cost for them. Therefore, investors are more likely to get their investment back in 5.123 years.

We recommend potential investors to avoid buying this bond due to the following reasons: (1) Triumph has performed poorly in the past few years; (2) Triumph's bonds are junk bonds (high default risk) as rated below BB or Ba by S&P and Moody, respectively; (3) Several similarly rated bonds have higher yield which implies that they are better investments than Triumph's bond. We recommend investors who already own the bond to sell this due to the same reasons.

INTRODUCTION

Triumph Group designs, engineers, manufactures, repairs, and overhauls various aerostructures, aircraft components and systems, and supports for commercial, general, and military customers and equipment manufacturers. It has three operating segments including Integrated Systems, Product Support (maintenance, repair, and overhaul), and Aerospace Structures (makes metallic and composite components). It has 44 subsidiaries and operates in 64 locations worldwide¹. Triumph's competitors include United Technologies (\$66.501), Rockwell Collins (\$8.665), Titan II (\$7.563), Spirit AeroSystems (\$7.222), and Transdigm Group (\$3.811), ordered according to their revenue in billion, Triumph being the sixth (\$3.199)¹. Due to the variety of products and services Triumph provides, it is difficult to evaluate its market share, as well as its competitors. Given its revenue of \$3.199 billion and total assets of \$3.807 billion, Triumph does not have significant concentration in this industry².

Triumph Group is exposed to several threats. First, US labor cost has been increasing in the past recent years. The company is seeking to spread further geographically which will require hiring more personnel. Currently, it employs more than 13,000 employees. More importantly, competition in the aerospace and defense industry is very tight with Tier 1 and Tier 2 aerostructure manufacturers, such as Boeing, Airbus, Lockheed Martin, etc. Tight competition will lead to the necessity of a price decrease, greatly impacting its financial stability. As the US aerospace industry is heavily regulated by the FAA, its operations would be adversely affected if materials approvals were suspended. Furthermore, Triumph Group provides its products and services through long-term contracts. Any unexpected delays and changes in price could make

¹“Who We Are.” *Triumph Group*, <www.triumphgroup.com/who-we-are/>(accessed March 18,2019)

² “Form 10-K.” SEC EDGAR, <<https://www.sec.gov>>(accessed March 18, 2019)

these contracts unprofitable. On the other hand, Triumph Group continues to sign new agreements, especially with Boeing, extending their contract for Boeing's 787 Dreamliner and 737 MAX components³. Triumph has been divesting their subsidiaries to avoid unprofitable businesses. Moreover, the US, China, and India's spending on defense have been increasing which could affect demand on the company's products and services⁴. Triumph also benefits from proprietary rights in the design, engineering, and manufacturing processes.

Triumph experienced a net loss of \$425.391 million in 2018 due to goodwill impairment, which means decrease in assets' value that Triumph acquired for more than their book value. Among the top ten competitors (Appendix A), Triumph is the only company that recorded loss in 2018 while the others generated income.

	Debt-to-equity	Return on Assets	Return on Equity	Interest Coverage
Triumph Group	3.19	-10.35%	-65.60%	-3.64
Spirit AeroSystems	1.53	11.26%	40.58%	10.45
United Technologies	1.18	4.56%	15.48%	7.76

Triumph operates with 3.19 debt-to-equity ratio, which means it borrows 3.19 times as much money as its stockholders' equity while its competitors are at most half of that. Their return on both assets and equity are negative while the industry performs positively. Interest coverage, which is calculated by earnings before interest and taxes (EBIT) divided by interest expense

³ Francis, Scott. "Boeing and Triumph Extend Composite Parts Agreement for 787 Dreamliner." <www.compositesworld.com/news/boeing-and-triumph-extend-composite-parts-agreement-for-787-dreamliner>(accessed March 18, 2019)

⁴ "Form S-4", SEC EDGAR, <<https://www.sec.gov/Archives/edgar/data/1021162/000104746917007017/a2233759zs-4.htm>>, (accessed March 20, 2019)

within the same period, is the ability of a company to pay interest on its outstanding debt. While the majority of the industry has a high-interest coverage ratio, Triumph's is negative. The bare minimum acceptable ratio is 2 in this industry. Therefore, lending money to Triumph is likely to be an unprofitable decision as the company seems not to generate profit or pay any interest due responsibly. Bondholders are likely not to receive coupon payments as agreed.

BOND ISSUE CHARACTERISTICS

Triumph issued up to \$500,000,000 in Senior Notes that have been registered under the Securities Act of 1933. The issue and maturity date of this bond are August 17, 2018 and August 15, 2025, respectively. The face value of the bond is \$500,000,000 with semiannual coupon payments made on February 15 and August 15 of each year until maturity or called by Triumph, beginning February 15, 2018. With a coupon rate of 7.750% per annum, the bond pays semiannual interest of \$387.50 for each \$1,000. The minimum settlement amount is \$2,000.

The bond may be redeemed by Triumph prior to August 15, 2020 at a redemption price of 100% of the principal amount plus accrued and unpaid interest to the redemption date. It is also subject to redemption during the 12-month period beginning August 15 of 2020 at 105.813%, 2021 at 103.875%, 2022 at 101.938%, and 2023 and thereafter at 100% of the principal amount plus accrued interest. If Triumph redeems the bond between coupon payment date, interest will accrue from last coupon payment date to its redemption date and be paid to bondholders. The bond issued by Triumph is a senior unsecured note meaning that it ranks high in Triumph' order of debt paid but at the same time it is an unsecured note since it has no collateral backing it has high credit risk signifying a real possibility of a default.

As of July 17, 2018, the bond was downgraded from B3 to Caa1 by Moody's and B to B- by S&P. Moody's Caa1 rating signifies that the bond is considered to be of poor quality and that it has high credit risk⁵. Furthermore, Moody's also changed Triumph's rating outlook to negative from stable. The reasoning behind this decrease was that Triumph's earnings in 2019 were

⁵ "Moody's downgrades Triumph Group, Inc. ratings: CFR to B3, outlook negative", Moody's, <https://www.moodys.com/research/Moodys-downgrades-Triumph-Group-Inc-ratings-CFR-to-B3-outlook--PR_386652>, (accessed April 10, 2019)

predicted to be weaker than prior expectations and that it currently has weak liquidity due to heavy reliance on external sources for financing.

YIELDS AND DURATION

When assessing the true value of the bond, the yield and duration are two important concepts that help us understand how much the bond will return at certain. The yield of a bond is broken down to different categories including the yield to maturity, yield to call, and nominal/current yield.

The nominal yield rate is the coupon rate that the issuer pays to its bondholders. Triumph's nominal yield is 7.750% on its corporate bond with a face value of \$10,000. Thus, the issuer would pay semi-annual coupon payments of \$387.50 every February and August until its maturity date on August 15, 2025. On the other hand, the current yield rate is determined by the bond's current price in the market as opposed to its face value. Using the ratio of the coupon rate and the current bond price, Triumph's current yield rate is 8.049%, which represents the bond's annual rate of return compared to the price on March 8, 2019.

The yield to maturity is the internal rate of return on a bond if it is held to its maturity date. The yield to maturity on this bond would be 8.511%. This rate is held constant and does not change from year to year. Because the yield to maturity rate of 8.511% is greater than the nominal yield rate of 7.750%, the bond would be sold at a discount. Furthermore, by using the yield to maturity rate to calculate the present value of the coupon payments and principal repayment, we calculated the base price to be \$9628.00, and an accrued interest of \$58.13, which leads to an invoice price of \$9686.13. Interest is accrued because this bond is traded between coupon payment dates.

The yield-to-call represents the rate of return if the bond is held to its call date, August 15, 2020. The call date signifies the earliest possible date that the issuer can pay of its bond to

the bondholders. However, the bond may be redeemed before call date at 100%. Below is call schedule for Triumph's bond.

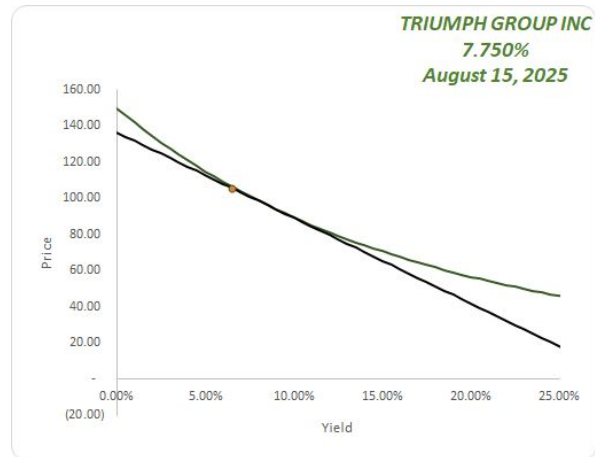
12 months after:	Call price	Yield-to-call
August 15, 2019	100%	17.038%
August 15, 2020	105.831%	14.537%
August 15, 2021	103.875%	10.970%
August 15, 2022	101.938%	9.536%
August 15, 2023 and thereafter	100%	8.780% (2023), 8.620% (2024), 8.511% (2025)

The yield-to-worst is 8.511% which is if the bond's yield-to-maturity. Triumph is highly unlikely to call the bond at all because the yield-to-worst of 8.511% is essentially the lowest borrowing cost Triumph has to pay to borrow from investors. In addition, a similar bond from Sprint Corporation with 7.000% coupon rate and matures on August 15, 2020, yields 3.843%. Calling the bond on August 15, 2020 would be a poor decision for Triumph since they will have to spend more on borrowing cost.

The duration of the bond is the average weighted term to maturity for the present value of all scheduled coupon payments to equal the bond's purchase price. It is an essential concept that is used to determine the timing of cash flows as well as the bond's sensitivity to interest rate risk. Modified duration represents the slope of the price-yield curve and indicates how much the price of a bond changes for every 1% change in interest rate. The bond's duration is 5.123 years if held to maturity, which means that investors will get their investment back in 5.123 years if Triumph does not call the bond before maturity date. If Triumph decides to call the bond on call date, the bond's duration is 1.370 years. Investors should refer to the former when considering this bond.

SENSITIVITY ANALYSIS

Bond price is sensitive to interest rate movement, and each bond has unique sensitivity toward this movement. Using duration, bond price sensitivity can be estimated. Price and yield have an inverse relationship as price increases when yield falls, and vice versa. Generally, higher duration implies higher price volatility



than bonds with shorter duration. This happens because bonds with shorter duration have earlier maturity, which means they return investors' principal more quickly. Hence, investors get to reinvest earlier. Bonds with longer durations have greater interest rate risk.

The figure above shows how the price of Triumph's bond behaves with respect to change in yield. The yellow dot indicates price and yield on March 8, 2019, which are 96.28 and 8.511%, respectively. The tangent line is constructed by plotting predicted price given change in yield, modified duration, and the current price (See Appendix E). Modified duration is a measure to estimate how much bond price changes toward change in interest rate. At 8.511%, modified duration of this bond is 4.914. A 1% increase in interest rate leads to approximately \$4.914 decrease in bond price, and vice versa. However, using duration only to evaluate price sensitivity may be less effective when assessing the effect of large changes in yield. Therefore, the convexity concept is also used in this report to assess this possibility. One must understand the relationship between price and yield is not linear, but convex. This can be seen by looking at the green curve. In higher yield environment, a 1% change in interest rate leads to a greater change in price, compared to lower yield environment.

CONCLUSION

From our analysis, it is evident that an investment in Triumph's bond is very risky in the current interest rate environment. Its bond rating is relatively low, with a rating of CCC+ and Caa1 for S&P and Moody's, respectively. Compared to competitors such as United Technologies and Spirit AeroSystems, Triumph's bond rating is lower. Both United and Spirit have been able to maintain their bond ratings at BBB for the S&P, while Triumph had recently degraded in the past year. This shows that Triumph's default risk is higher than its competitors. Furthermore, Triumph has shown poor financial health in the past few years, including net loss in 2018, negative interest coverage, and high debt-to-equity ratio. It indicates that the company is operating under numerous debts and its capability to pay its debts is questionable.

Triumph's yield is 8.511% if held to maturity and 14.537% if called on the call date. Its nominal yield rate is 7.750%, which is the same as its coupon rate. Its current, or income yield, is 8.049%, which is the investors' annual return from coupons divided by price paid on last traded date (March 8, 2019). Its high expected yield-to-call is a good indication that Triumph may not call the bond on an earlier date. If held to maturity, the duration of the bond would be 5.129 years, and if called on the call date, the duration would be 1.375 years. Since the bond is unlikely to be called, it will take longer to pay off the bond, thus posing more interest rate risk.

Compared to similarly rated bonds, Triumph's yield tends to be higher. All these bonds fall under a range of 6-8.5% yield, with Triumph's bond having the second highest yield. While it does have a higher yield, Triumph's bond would ultimately be a risky investment due to its bond rating and financial instability. Given these facts, investors should not buy Triumph's bond if they do not currently own it. Investors should sell this bond if they currently own it.

APPENDIX A: Cover page of the Bond Indenture

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Filed Pursuant to Rule 424(b)(3)
Registration Statement No. 333-221541

OFFER TO EXCHANGE



TRIUMPH GROUP, INC.

Offer to Exchange

7.750% Senior Notes due 2025 Registered under the Securities Act

for

A Like Principal Amount of Outstanding 7.750% Senior Notes due 2025

We are offering, upon the terms and subject to the conditions set forth in this offer to exchange and the accompanying letter of transmittal, to exchange up to \$500,000,000 aggregate principal amount of our 7.750% Senior Notes due August 15, 2025, registered under the Securities Act of 1933, as amended (the "Securities Act") and referred to in this offer to exchange as the new notes, for an equal principal amount of our outstanding 7.750% Senior Notes due August 15, 2025, which are referred to in this offer to exchange as the old notes. The new notes will represent the same debt as the old notes and will be issued under the same indenture as the old notes.

**The exchange offer expires at 5:00 p.m., New York City time,
on January 15, 2018, unless extended.
Terms of the Exchange Offer**

- We will exchange new notes for all old notes that are validly tendered and not withdrawn prior to the expiration of the exchange offer.
- You may withdraw tenders of old notes at any time prior to the expiration of the exchange offer.
- The terms of the new notes will be identical in all material respects to the terms of the old notes, except that the new notes will be registered under the Securities Act and will generally not be subject to transfer restrictions, will not be entitled to registration rights and will not have the right to earn additional interest under circumstances relating to our registration obligations.
- The new notes will be guaranteed on a full, joint and several basis by each of our domestic restricted subsidiaries that is a borrower under any of our credit facilities or that guarantees any of our debt or that of any of our restricted subsidiaries under our credit facilities and in the future by any domestic restricted subsidiaries that are borrowers under any credit facility or that guarantee any of our debt or that of any of our restricted subsidiaries incurred under any credit facility.
- We will not receive any cash proceeds from the exchange offer.
- The exchange of old notes for new notes pursuant to this exchange offer generally will not be a taxable event for U.S. federal income tax purposes. See the discussion under the caption "Material U.S. Federal Income Tax Consequences."
- There is no existing market for the new notes to be issued, and we do not intend to apply for listing or quotation on any securities exchange or market.

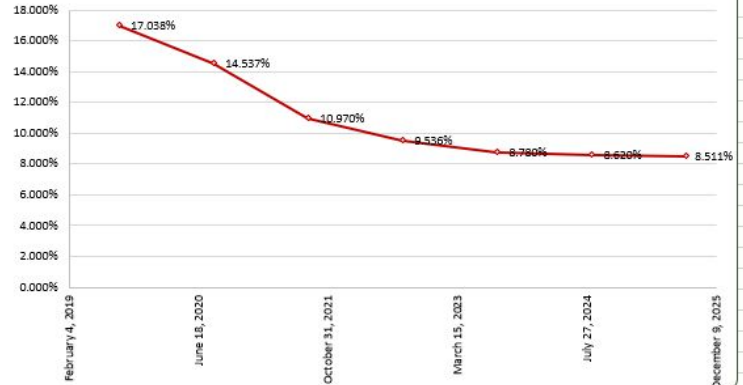
APPENDIX B: Yield-to-Maturity

YIELD TO MATURITY										
Bond Particulars			Market Data			Date Calculations				
			Price Date: (NASD)		Friday, March 8, 2019		Days to Accrue			27 days
Symbol:	TGI4532213		Settlement		Tuesday, March 12, 2019		Days to Next Coupon		153 days	
CUSIP:	896818AP6		Price:		96.280		Coupon		387.5	
Issuer:	Triumph Group						Date of Next Coupon		August 15, 2019	
Coupon:	7.750%		Price Calculations			Coupons Remaining				13
Maturity:	August 15, 2025		Principal:		\$	10,000.00				
			Base price:		\$	9,628.00	Duration (calculated)		5.1231 years	
			Accrued Interest:		\$	58.13	Duration (excel)		5.1231 years	
			Invoice Price:		\$	9,686.13	Modified Duration		4.9140	
							Convexity (excel)		32.76089237 years squared	
							Modified Convexity		30.14086695	
			Yield to Maturity		8.511%					
Total Payments Price										
			\$		9,686.13	1.000000	10.2462	131.0435695		
Date	Time	Coupon	PV	NPV/Price	Duration	Convexity				
1	August 15, 2019	153/180	\$ 387.50	\$ 374.01	0.038613	0.0328	0.060719347			
2	February 15, 2020	1 153/180	\$ 387.50	\$ 358.75	0.037037	0.0685	0.195277874			
3	August 15, 2020	2 153/180	\$ 387.50	\$ 344.10	0.035525	0.1012	0.389800191			
4	February 15, 2021	3 153/180	\$ 387.50	\$ 330.06	0.034075	0.1312	0.636266319			
5	August 15, 2021	4 153/180	\$ 387.50	\$ 316.58	0.032684	0.1585	0.927329508			
6	February 15, 2022	5 153/180	\$ 387.50	\$ 303.66	0.031350	0.1834	1.256269803			
7	August 15, 2022	6 153/180	\$ 387.50	\$ 291.26	0.030070	0.2060	1.616950481			
8	February 15, 2023	7 153/180	\$ 387.50	\$ 279.37	0.028843	0.2264	2.003777186			
9	August 15, 2023	8 153/180	\$ 387.50	\$ 267.97	0.027665	0.2448	2.411659609			
10	February 15, 2024	9 153/180	\$ 387.50	\$ 257.03	0.026536	0.2614	2.835975572			
11	August 15, 2024	10 153/180	\$ 387.50	\$ 246.54	0.025453	0.2762	3.272537366			
12	February 15, 2025	11 153/180	\$ 387.50	\$ 236.48	0.024414	0.2893	3.717560217			
13	August 15, 2025	12 153/180	\$ 10,387.50	\$ 6,080.32	0.627734	0.0664	111.719446			

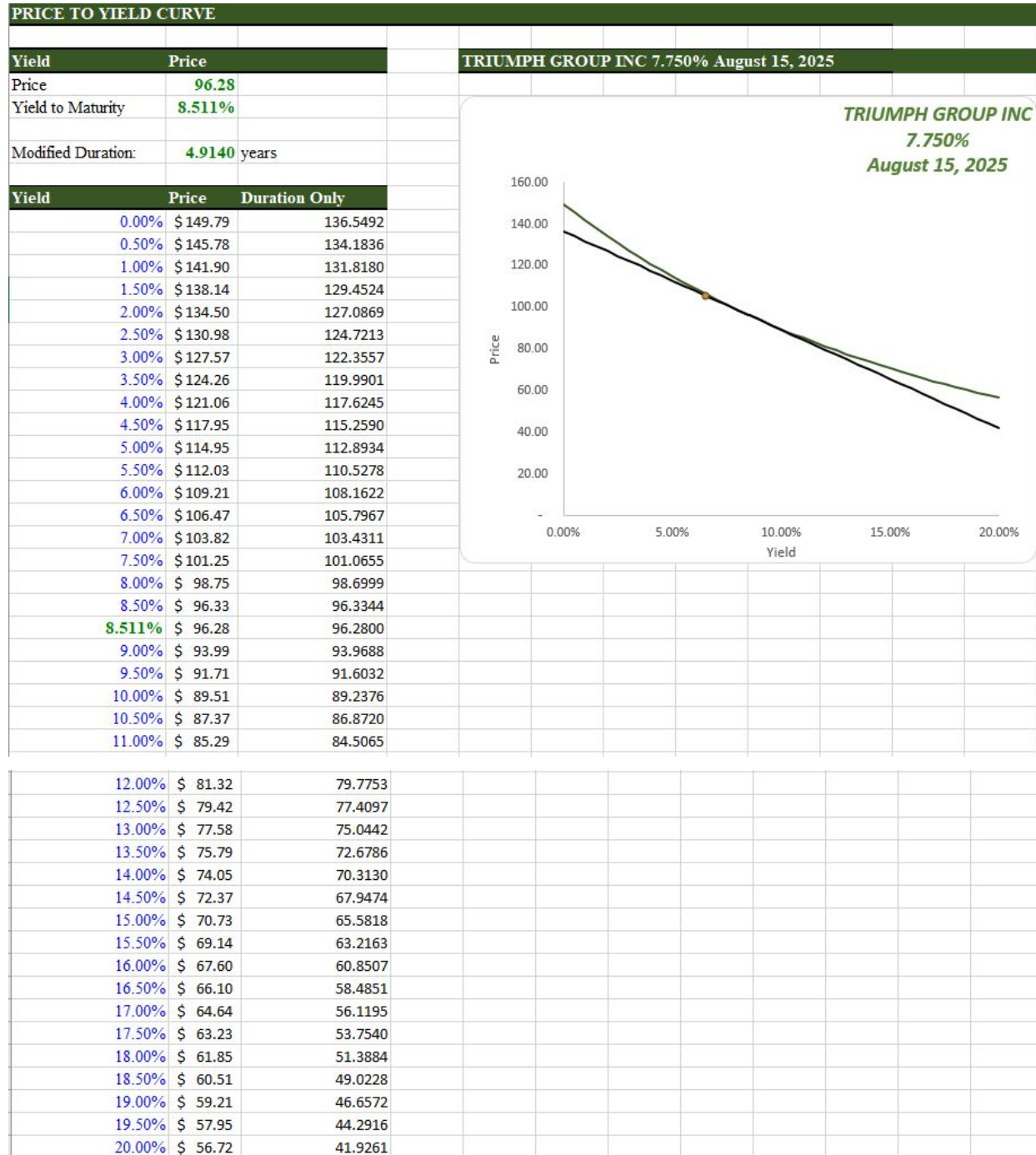
APPENDIX D: Call Schedule

CALL SCHEDULE							
Bond Particulars		Market Data		Call Schedule			
Symbol:	TGI4532213	Price Date: (NASD)	Friday, March 8, 2019	Call	Call Price	Yield to Call	Yield to Worst
CUSIP:	896818AP6	Settlement:	Tuesday, March 12, 2019	August 15, 2019	100.000	17.038%	
Issuer:	Triumph Group	Price:	96.280	August 15, 2020	105.813	14.537%	
Coupon:	7.750%			August 15, 2021	103.875	10.970%	
Maturity:	August 15, 2025			August 15, 2022	101.938	9.536%	
				August 15, 2023	100.000	8.780%	
First Call Date:	August 15, 2020			August 15, 2024	100.000	8.620%	
Call Price:	105.813			August 15, 2025	100.000	8.511%	Yield to Worst


Call Schedule



APPENDIX E: Price-to-Yield Curve



APPENDIX F: COMPETITORS

									
Powered by Clearbit									
Triumph Group Inc. (NYS: TGI)									
Competitor (Public USA)									
Company Name	Revenues	Gross Margin	Net Income	EBITDA	Total Assets	Total Liabilities	PE Ratio	Employee	Share Price
United Technologies Corp	\$ 66,501,000,000.00	24.84	\$ 5,269,000,000.00	\$ 10,558,000,000.00	\$ 134,211,000,000.00	\$ 95,765,000,000.00	20.4908	240200	133.19
Honeywell International Inc	\$ 41,802,000,000.00	30.52	\$ 6,765,000,000.00	\$ 8,308,000,000.00	\$ 57,773,000,000.00	\$ 39,586,000,000.00	17.9811	114000	161.47
Textron Inc	\$ 13,972,000,000.00	17.02	\$ 1,222,000,000.00	\$ 1,908,000,000.00	\$ 14,264,000,000.00	\$ 9,072,000,000.00	10.6791	35000	51.58
Spirit AeroSystems Holdings Inc	\$ 7,222,000,000.00	15.04	\$ 617,000,000.00	\$ 844,900,000.00	\$ 5,685,900,000.00	\$ 4,448,300,000.00	16.5752	17000	93.65
TransDigm Group Inc	\$ 3,811,126,000.00	57.14	\$ 957,062,000.00	\$ 1,778,409,000.00	\$ 12,197,467,000.00	\$ 14,005,938,000.00	31.8075	10100	464.39
Triumph Group Inc.	\$ 3,198,951,000.00	20.81	\$ (425,391,000.00)	\$ (260,533,000.00)	\$ 3,807,064,000.00	\$ 3,356,530,000.00	-	13554	19.83
Teledyne Technologies Inc	\$ 2,901,800,000.00	38.28	\$ 333,800,000.00	\$ 492,900,000.00	\$ 3,809,300,000.00	\$ 1,579,600,000.00	26.6604	10850	240.21
Woodward, Inc.	\$ 2,325,873,000.00	26.06	\$ 180,378,000.00	\$ 317,724,000.00	\$ 3,790,649,000.00	\$ 2,252,545,000.00	29.1152	8300	96.08
HEICO Corp	\$ 1,777,721,000.00	38.85	\$ 259,233,000.00	\$ 399,387,000.00	\$ 2,653,396,000.00	\$ 1,255,145,000.00	48.8707	5400	98.23
AAR Corp	\$ 1,748,300,000.00	16.85	\$ 15,600,000.00	\$ 140,900,000.00	\$ 1,524,700,000.00	\$ 588,400,000.00	-	5000	33.48
Barnes Group Inc.	\$ 1,495,889,000.00	35.59	\$ 166,186,000.00	\$ 273,250,000.00	\$ 2,808,970,000.00	\$ 1,605,914,000.00	16.727	5908	52.69
Ducommun Inc.	\$ 629,307,000.00	19.48	\$ 9,035,000.00	\$ 36,795,000.00	\$ 648,143,000.00	\$ 391,318,000.00	57.1039	2600	43.97
SIFCO Industries Inc.	\$ 111,212,000.00	9.08	\$ (7,170,000.00)	\$ 3,059,000.00	\$ 102,237,000.00	\$ 58,048,000.00	-	453	2.76
Logistical Support Inc	\$ 6,611,412.00	21.3	\$ 67,911.00	\$ 253,495.00	\$ 3,280,489.00	\$ 1,794,906.00	-	29	0
U.S. Aerospace Inc	\$ 3,726,431.00	-1.82	\$ (14,920,862.00)	\$ (9,945,065.00)	\$ 5,443,348.00	\$ 10,167,691.00	-	30	0
Blackpoll Fleet International Inc	\$ 1,073,048.00	28.05	\$ (320,459.00)	\$ (320,100.00)	\$ 407,128.00	\$ 683,298.00	-	6	0
Groen Brothers Aviation Inc	\$ 12,000.00	41.67	\$ (25,809,000.00)	\$ (2,965,000.00)	\$ 48,000.00	\$ 191,294,000.00	-	13	0