



2016 North American Market Outlook

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- **This perspective of the investment casting industry is based on the collective input of ICI Members, government agencies, related trade associations, industry publications, customers and individual contributors**
- **Sales numbers, market segment breakdown, and forecasts are ‘Best Estimates’**
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- Overall 2015 sales of investment castings produced in North America reflected 4+% growth over 2014 levels
- Sector performance varied widely, from significant gains to staggering declines

Environment...

- Feelings about the economy are mixed
- Aerospace and automotive continue to show growth
- Major downturns in several sectors due to oil over-supply

Industry Concerns...

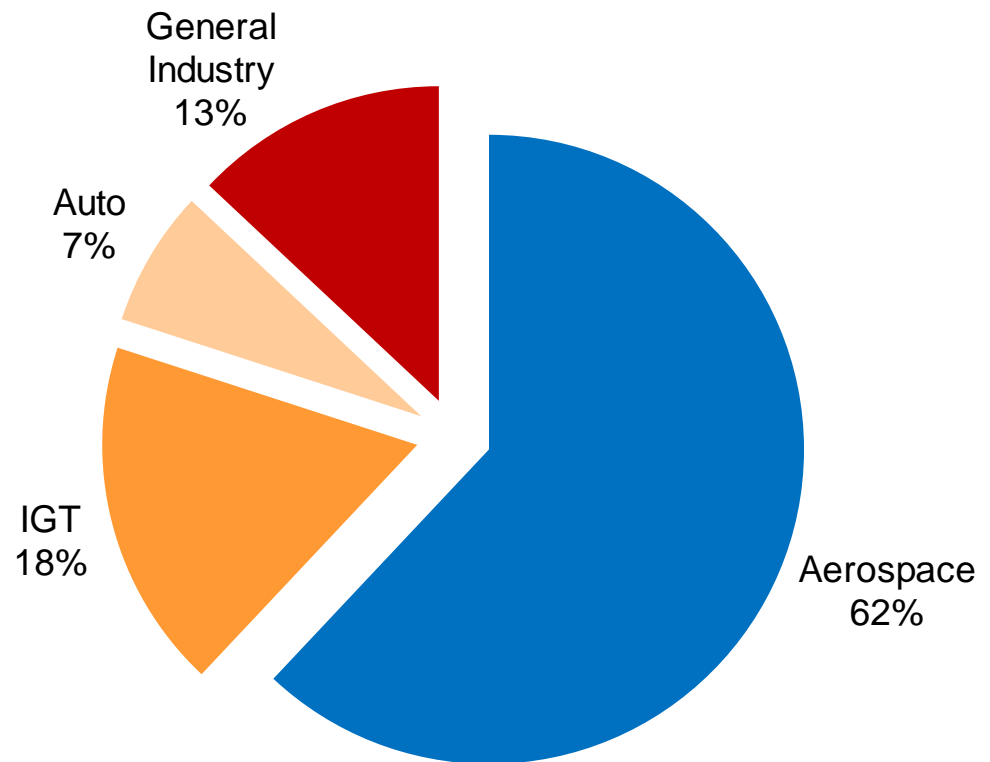
- Election year apprehension
- Government regulation cost
- Health care insurance
- Finding, retaining & developing skilled labor

North American Investment Casting 2015 Sales by Sector (\$ Billion)



Aerospace/Defense	3.38
IGT	0.98
Automotive	0.41
General Industry	0.72

TOTAL: \$ 5.49 Billion

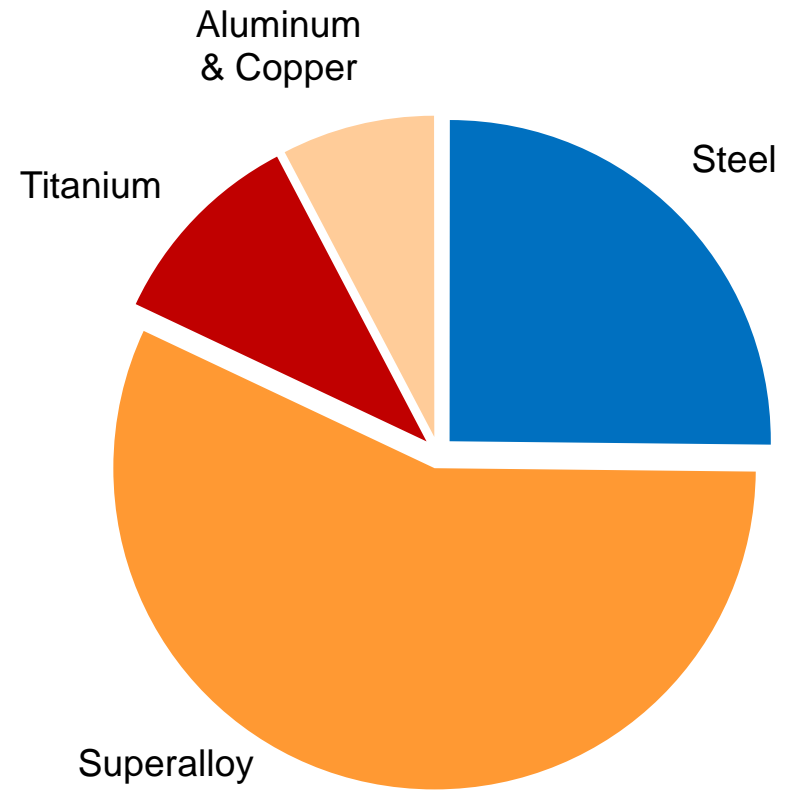


North American Investment Casting 2015 Sales by Alloy Type (\$ Billion)



Aluminum & Copper	8%
Titanium	10%
Steel	25%
Superalloy	57%

TOTAL: \$ 5.49 Billion





- **World oil overproduction driving inventory surplus**
 - **Impact not limited to oil & gas sector**
 - **Pump & valve, agriculture, transportation, mining... affected**
 - **Aerospace and automotive benefitting from low gas prices**
- **Dollar grew by over 20% against major world currencies**
 - **NA imports on the rise, exports showing decline**
- **Low interest rates driving consumer durable goods spending**
- **US Budget Debt Ceiling Extension in place through end of 2016**
 - **Defense spending at elevated levels**
- **Aging baby boomers benefitting orthopedic and medical**



- **Aerospace and Defense**
- **Industrial Gas Turbines**
- **Automotive**
- **General Industry**

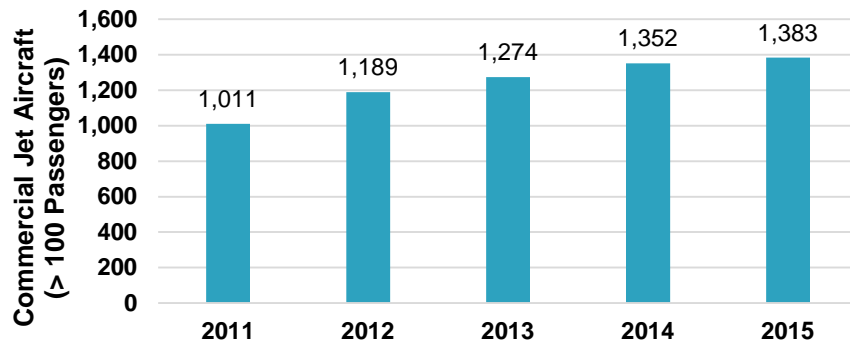


- **Despite lower fuel costs, replacement of obsolete aircraft with next generation fuel efficient aircraft continues**
- **Lower fuel prices helping carriers, but negatively impacting helicopter sales**
- **Revenue Passenger Miles up 6.4%**
- **2015 saw record airframe deliveries**
- **Orders are off, but backlog is equivalent to 9 years' production**
- **Air traffic expected to double within 15 years**
- **Single aisle aircraft account for 70% of all units produced**
- **Wide body aircraft generate over 50% of OEM revenues**
- **APAC leading growth, followed by Europe and North America**

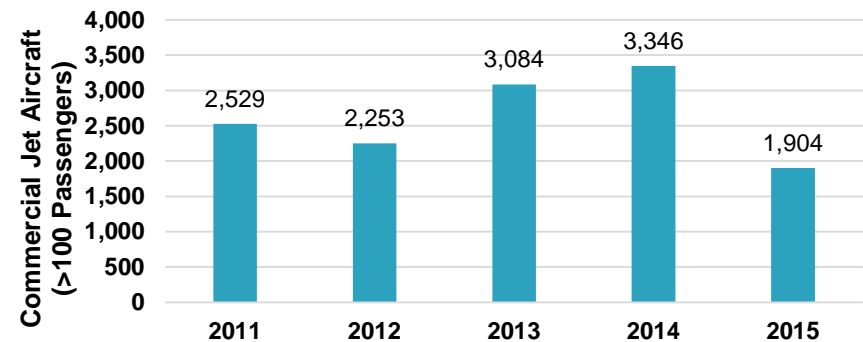
Commercial Aircraft (>130 Passengers) Deliveries, Orders and Backlog



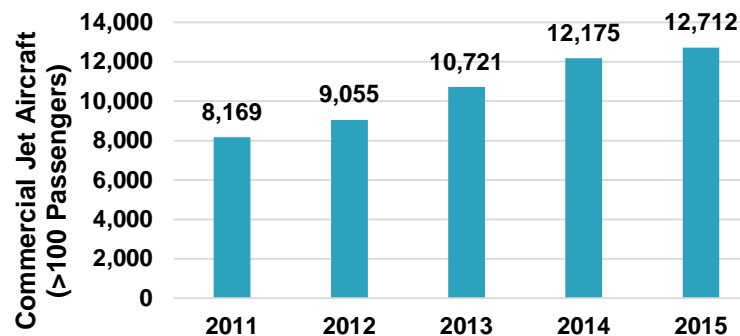
Commercial Aircraft Deliveries CAGR 6.5%



Commercial Aircraft Orders CAGR -5.5%



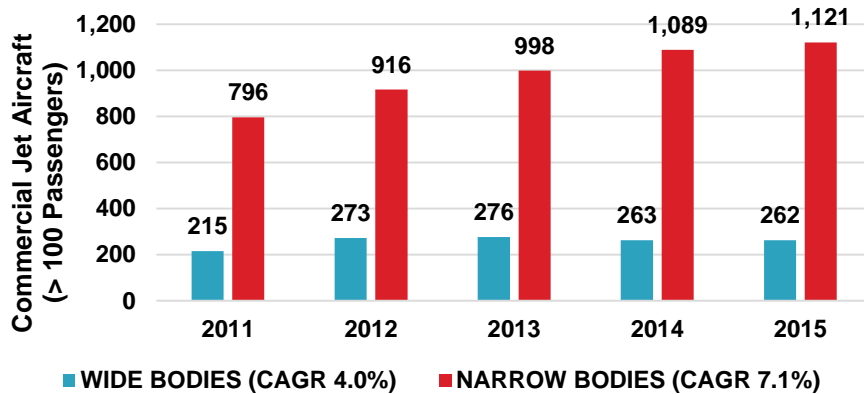
Commercial Aircraft Backlog CAGR 9.2%



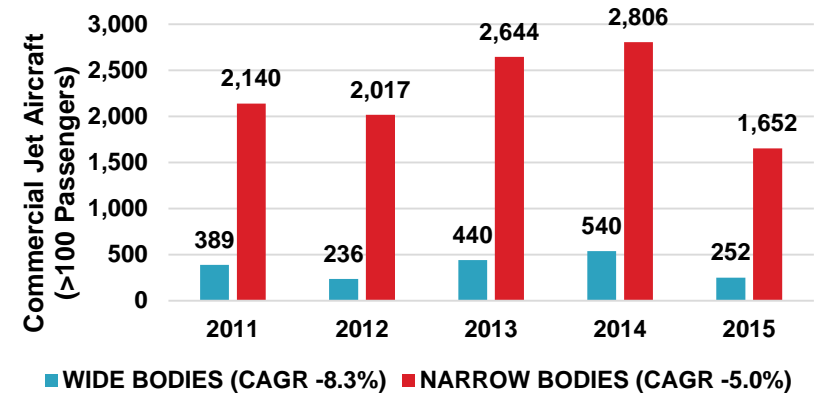
Wide Body vs. Narrow Body Commercial Aircraft Metric Performance



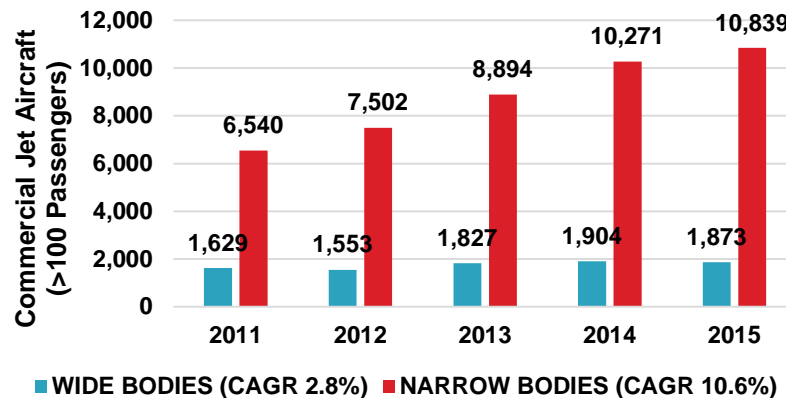
Commercial Aircraft Deliveries



Commercial Aircraft Orders



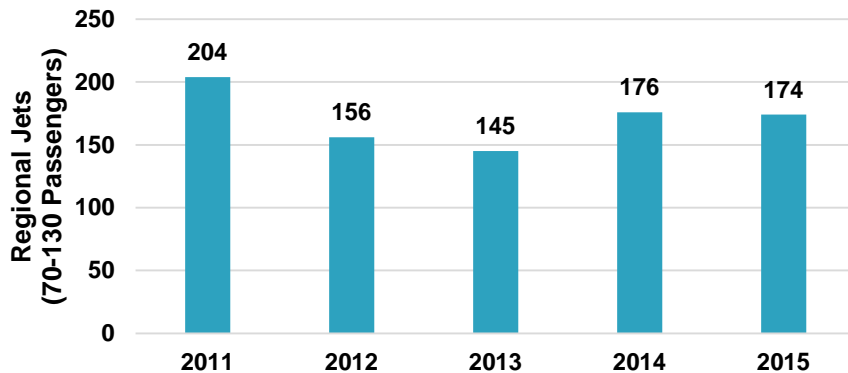
Commercial Aircraft Backlog



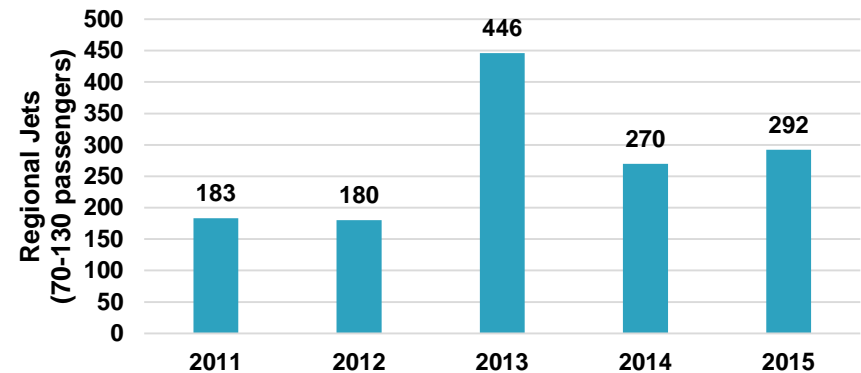
Regional Jets (70-130 Passengers) Deliveries, Orders and Backlog



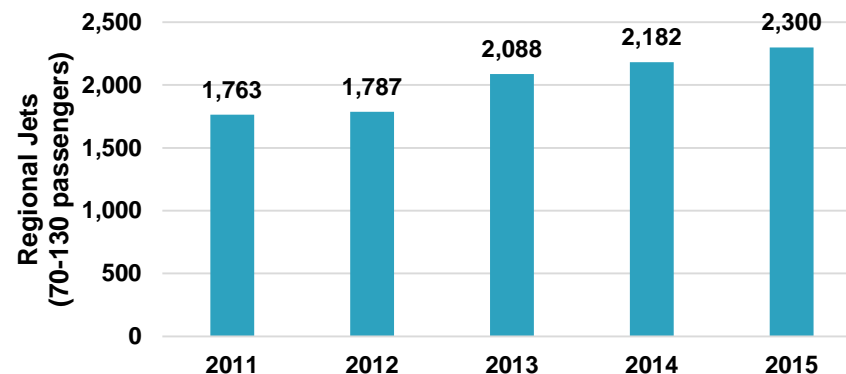
Regional Jet Deliveries CAGR -3.1%



Regional Jet Orders CAGR 9.8%



Regional Jet Backlog CAGR 5.5%





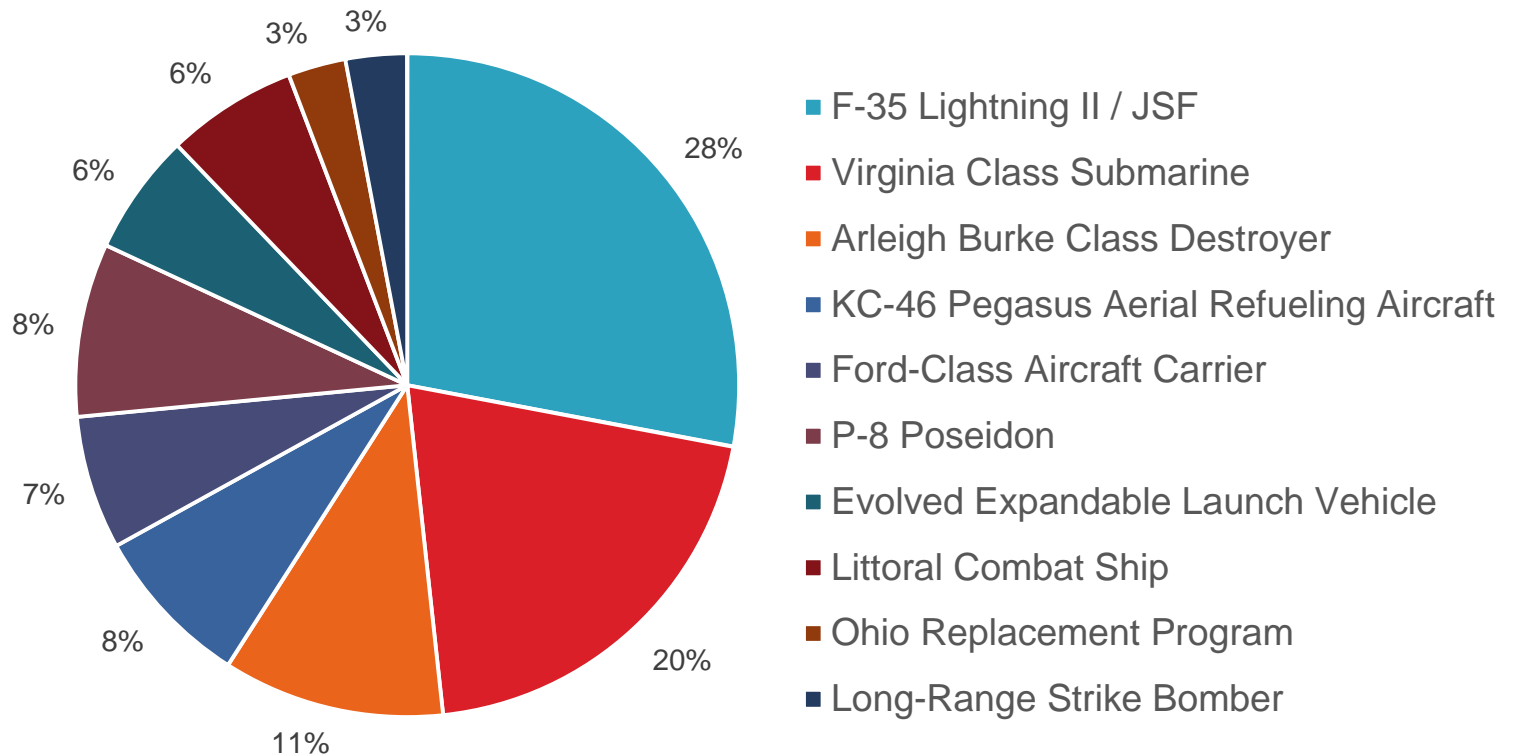
- **October 2015 Debt Ceiling Extension in place through 2016**
 - **Spending up 7.0% on top 10 procurement programs**

- **2016 Budget**
 - **Top 10 procurement programs budgeted at 19.3% over 2015**
 - **Key Program cancellations deferred**
 - **A-10 Warthog will remain in service through 2022**
 - **Extend life for F/A-18E/F Super Hornet through 2017**

- **Future Years Defense Program (FYDP 2017-2021)**
 - **USAF diverting funds for JSF and LRSB F-15/F-16 upgrades**
 - **404 F-35's to be purchased over 5 years**
 - **Navy revamp of UCLASS UAV as a refueling tanker**

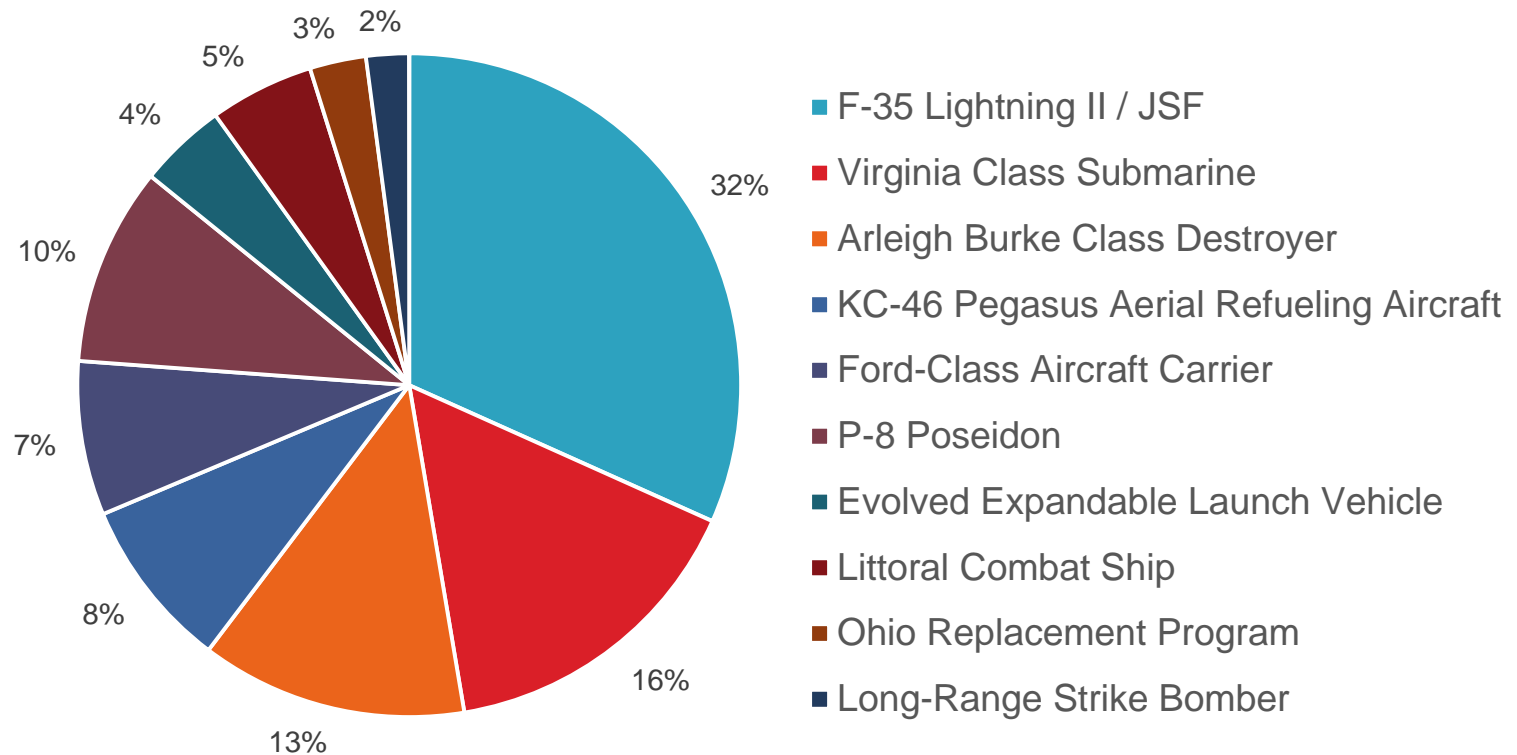


Top 10 Pentagon Procurement Programs - 2015 Actual \$29.6 Billion





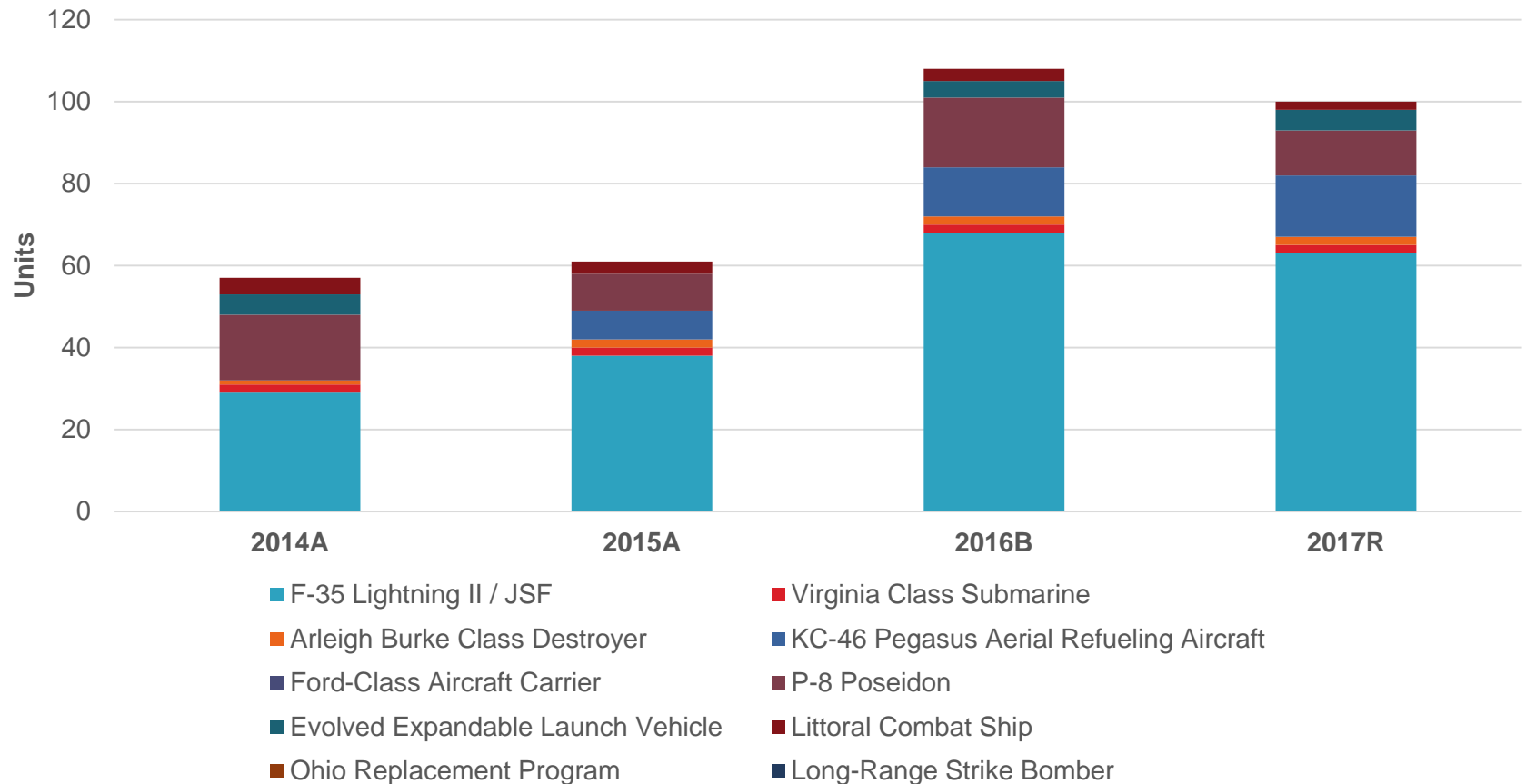
Top 10 Pentagon Procurement Programs - 2016 Budget \$35.3 Billion



Growth in Program Procurement – Key Programs



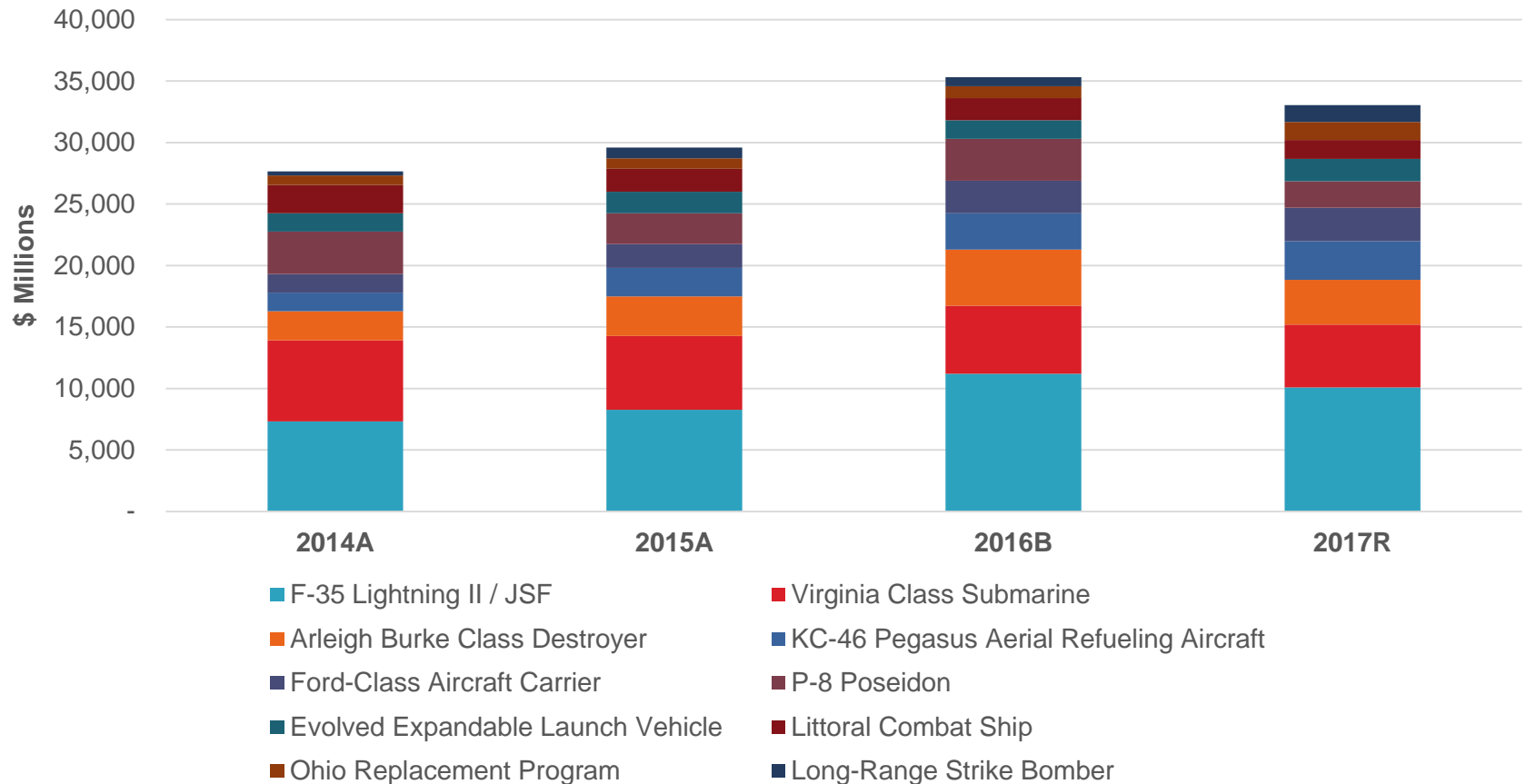
Top 10 Pentagon Procurement Programs



Growth in Program Spending - Key Programs



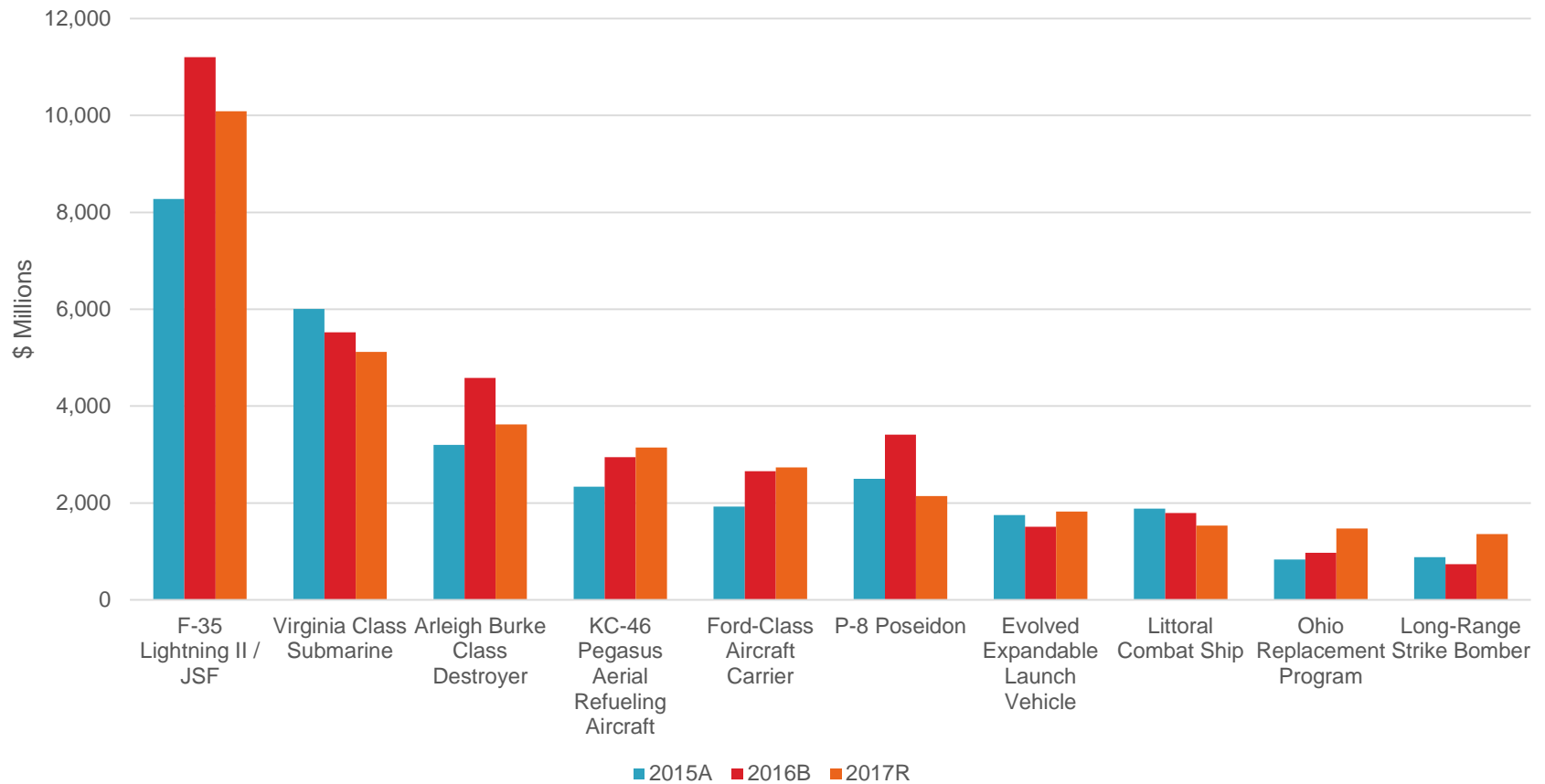
Top 10 Pentagon Procurement Programs



Key Program Spend



Top 10 Pentagon Procurement Programs





- **Commercial Aerospace**
 - 2015 finished at 15+% growth over 2014
 - OEM's stating that 2016 buy will be 17% to 20% growth
 - Ti growing at a higher rate than Aluminum and Super Alloys

- **Defense**
 - Industry was down prior to Debt Ceiling Extension
 - This year's sales showed 7% growth, though results varied significantly by company
 - 2016 is expected to yield 7% to 9% growth



- **2015 showed no notable sales growth: spares driven sales**
- **GE acquisition of Alstom completed November 2015**
 - **Restructuring to be complete by mid-year 2016**
- **Total demand for electric power fell for 5th time since 2008**
 - **Declining sales in industrial sector**
 - **Little/no growth to residential & commercial building sectors**
- **Era of lackluster growth continues**
 - **Well established N American and European infrastructure**
 - **Asian economic concerns**
- **2016 expected to be relatively flat**



- **2015 witnessed the sale of 17,470,659 passenger vehicles, a 5.7% increase over 2014, breaking the record set in 2000**
 - **Low gasoline prices**
 - **Pent-up demand**
 - **Widespread credit availability**
 - **Increase in leasing**
 - **Employment Gains**
 - **Incentives**

- **Trucks, SUVs and crossover sales were up 13%, while passenger car sales were off 2.3%**

- **Leasing accounted for 29% of all new auto sales (up 2%), driven by increases in new vehicle transaction pricing (up 2.5%)**

Industry Analysts See Continued Growth



“The U.S. economy continues to expand and the most important factors that drive demand for new vehicles are in place, so we expect to see a second consecutive year of record industry sales in 2016.”

- Mustafa Mohatarem, Chief Economist, General Motors Co.

"Interest rates would have to reach 3 percent next year before we see an inflection point that causes the year-over-year growth rate to stagnate."

- Oliver Strauss, Chief Economist, TrueCar

“Cars on the roads today are the oldest they’ve ever been . . . and if people are employed, they feel more comfortable taking on loans for a car.”

- Michelle Krebs, Senior Analyst, AutoTrader.com

However, some cite caution points



“The industry is making the same set of mistakes it made before,...
Poorly competing against foreign competition and becoming dependent
on sales of gas-guzzlers and hoping that gas prices stay low — which
they won’t forever.”

- Dan Becker, Director, Safe Climate Campaign

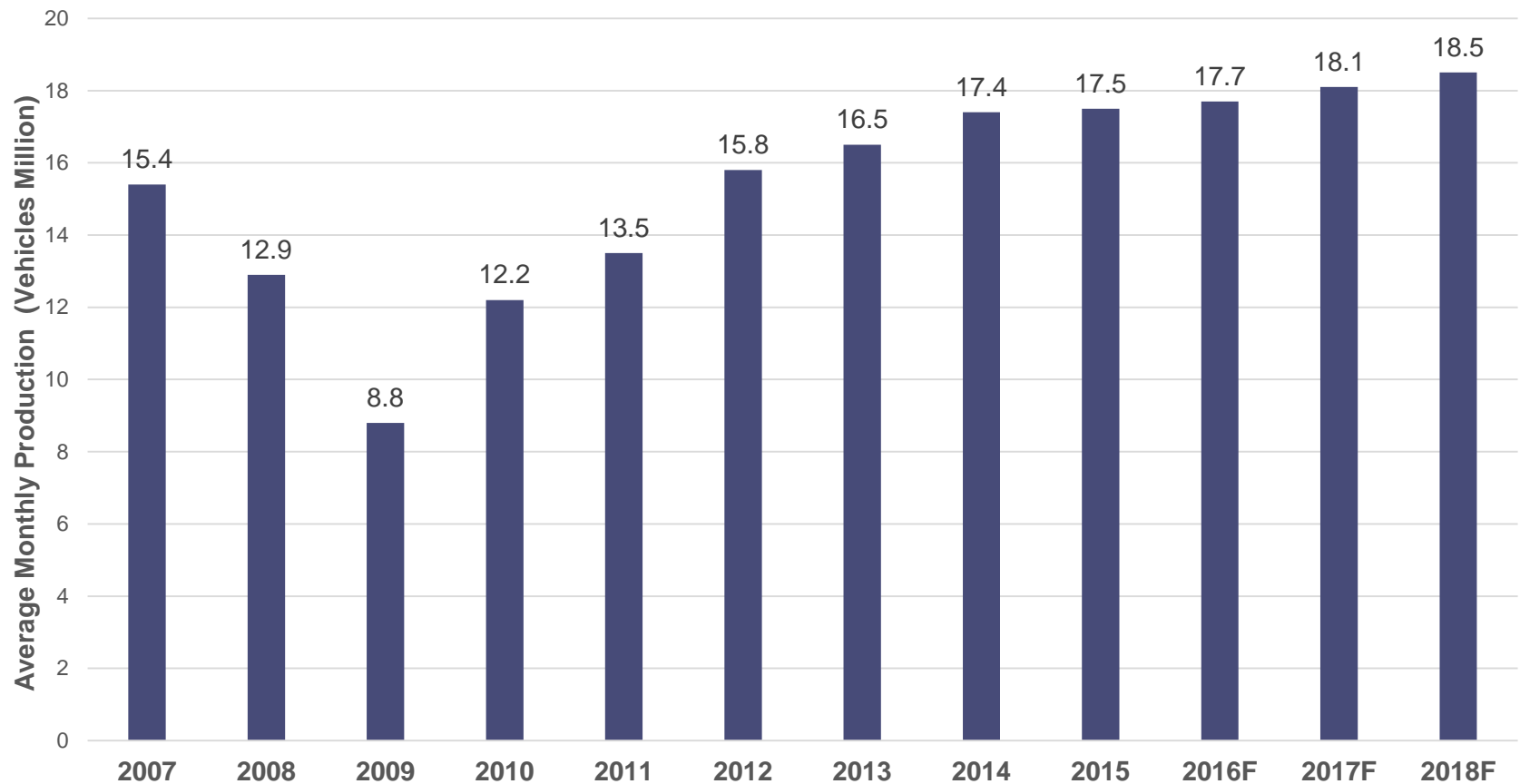
- **Many question the sustainability of current production levels**
 - **Fuel costs will eventually rise**
 - **Cost of financing will go up**
 - **Inventory of “newer used cars” is rapidly rising**

- **Ongoing need for advanced materials and component complexity still a driver for casting sales**
 - **2016 anticipated growth at 2 to 4%**

North American Motor Vehicle Production



North American Motor Vehicle Production Forecast 2016-2018





- **Market sector generally tracks closely to the US rate of industrial production, which was 1.3% for 2015**
- **Member survey data indicates**
 - **2015 growth at 0.6%**
 - **2016 at 2.8%**





- **The industry witnessed a 7+% rise in 2015**

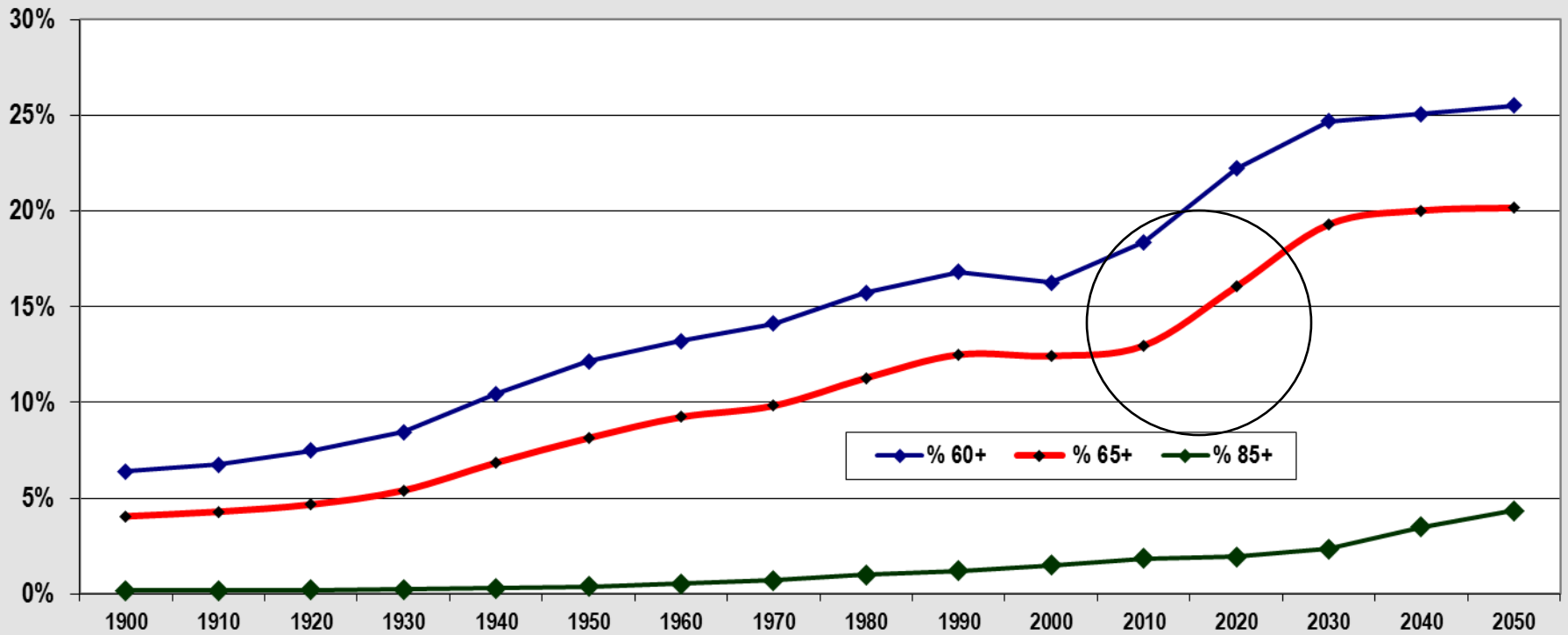
- **Growth being fueled by**
 - **Aging baby boomers**
 - **Rise in osteoporosis-related fractures and musculoskeletal diagnoses**
 - **Active lifestyle trends driving implants in younger demographics**
 - **Technology advances extending implant life, enhancing acceptability among younger patients**

- **This sector is expected to continue growing at the same rate for 2016 and beyond**

Baby boomers over 65 driving orthopedics



Older Population by Age: 1900-2050 - Percent 60+, Percent 65+, and 85+





- **2015 US field production was up 8% from 2014**
 - **Wells on leased land pumping non-stop**
 - **YOY change in production output grew increasingly smaller with each passing month**

- **World production exceeding demand by 1 million barrels / day**
 - **Build up of surplus inventories have resulted in significant production push outs and lower fuel prices**
 - **Rig count down over 75% from 2013 high**
 - **New exploration and production ground to a halt**

- **Oil producers have nearly twice the required inventory of investment castings on the shelf**



- **Reported 2015 casting sales offered conflicting results**
 - **Conversations with Members indicate that casting sales were down by 40% to 70%**
 - **ICI Market Survey data indicated a 17% decline**
 - **Responses ranged from a 5% to 50% decline**
 - **Overall decline softened through discounted sales of casting inventories**

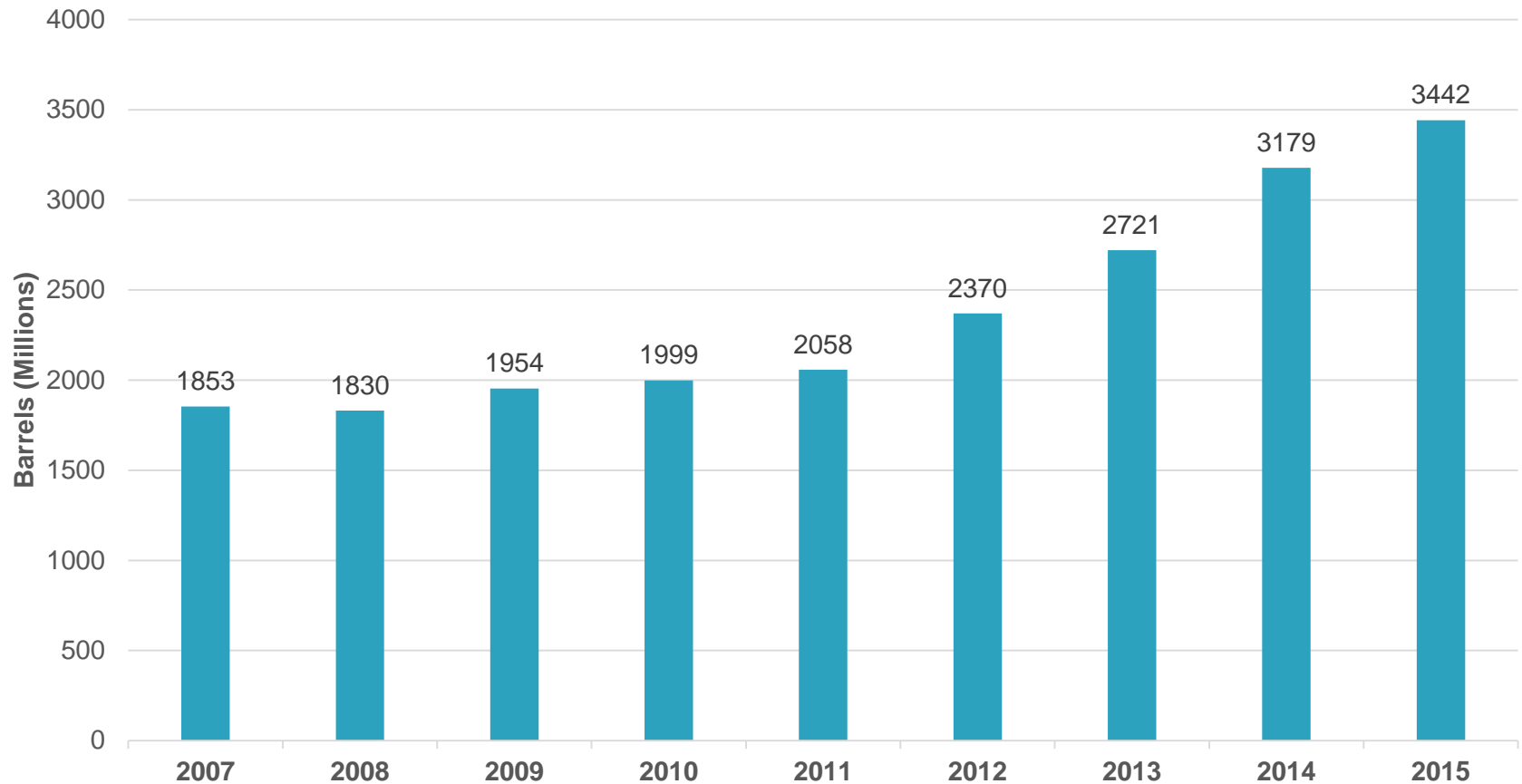
- **There is greater inconsistency in the projected 2016 outlook**
 - **Conversations resulted in 0% to 50% further decline**
 - **Survey results indicate further decline ranging from 0% to -45%, but heavily weighted towards the high end**

- **2016 is expected to see further decline on the order of 40%**

2015 set new record production level



U.S. Field Production of Crude Oil



January 2015 first month of YOY contraction in US oil production since September 2011



U.S. monthly oil production and year-over-year change



Source: U.S. Energy Information Administration, *Petroleum Supply Monthly*





- **Recreational Firearm Sales**
 - 2015 was relatively flat in comparison to 2014 levels
 - Members expect a moderate 2% growth in 2016

- **Medical Devices**
 - Foundries reported 2015 growth of 5.4%
 - Anticipate nearly 7% growth in 2016

- **Dairy and Food Processing Equipment**
 - 2015 sales were up 8.6%
 - 2016 sales are expected to grow by 6.3%

- **Reported data for other products showed wide variation with weighted averages of -0.6% for 2015 and 1.6% for 2016**

North American Investment Casting 2015 Sales vs. 2016 Forecast (\$ Billion)



	2015	2016F
Aerospace	3.38	3.79
IGT	0.98	0.98
Automotive	0.41	0.41
General Industry	0.72	0.74
	\$ 5.49B	\$ 5.92B (8%)

Summary



- **North American IC industry expected to grow approximately 8%**
- **Commercial Aerospace – Increasing build rates, new models & strong outlook**
- **Defense rebounding**
- **IGT – Moderate activity with gradual growth**
- **Orthopedics and Medical – consistent strong growth**
- **Automotive – Moderate growth, but may be peaking**
- **Oil & Gas, Agriculture, Mining, Pumps & Valves significantly off**
- **Recreational Fire Arms – Moderate Growth**