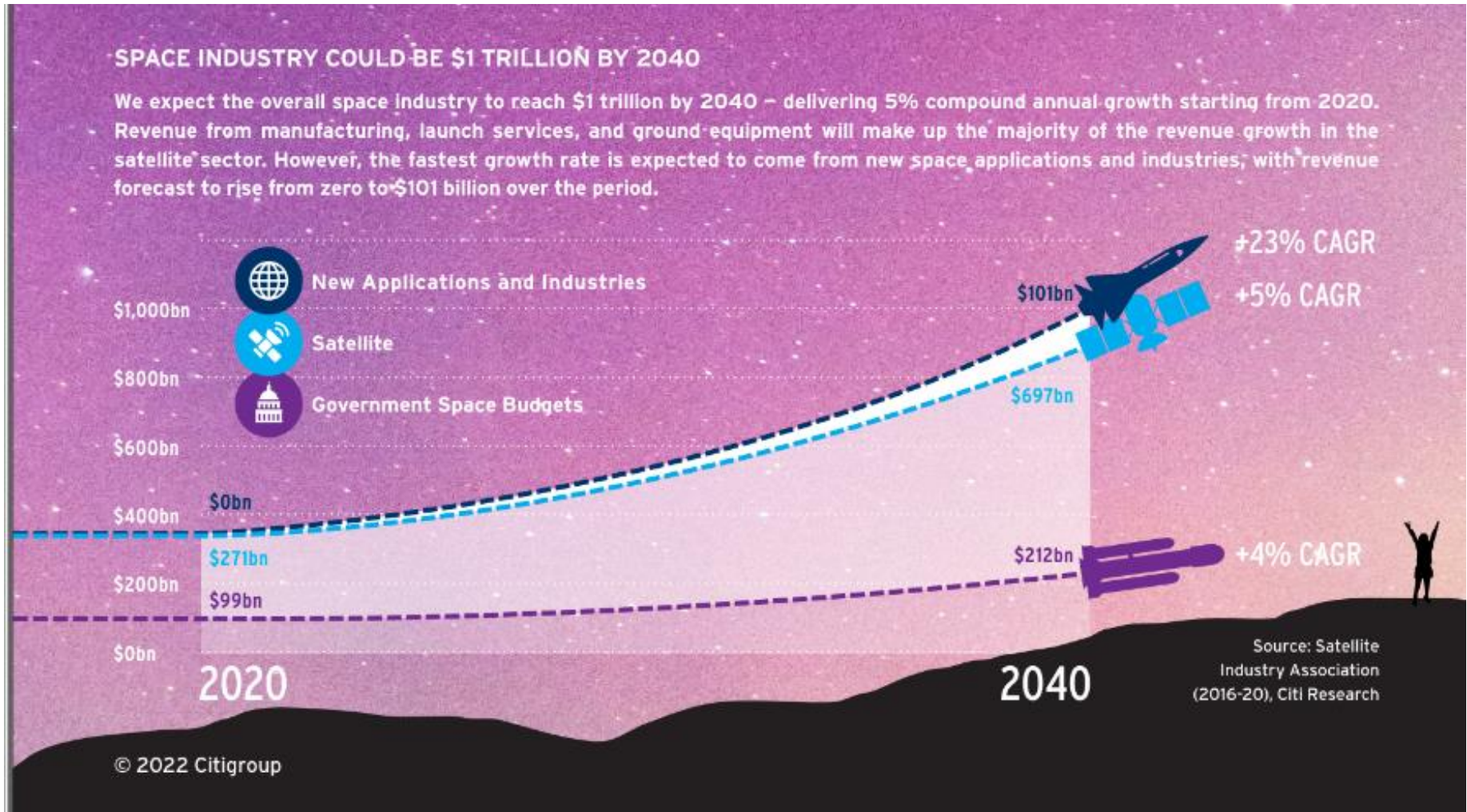


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SPACE

The Dawn of a New Age



Studie om rymden som affärsmarknad av Citi Global Perceptivas & Solutions. Maj 2022.

LAUNCH COSTS ARE A KEY ENABLER

We view more affordable launch costs as the primary enabler in making space accessible to a wider variety of applications. Launch costs are already 40x lower than they were in the 1980s. We expect them to fall an additional ~95% to around \$100/kg by 2040 driven by reusability, scale, lower input costs, and cost-efficient production methods.

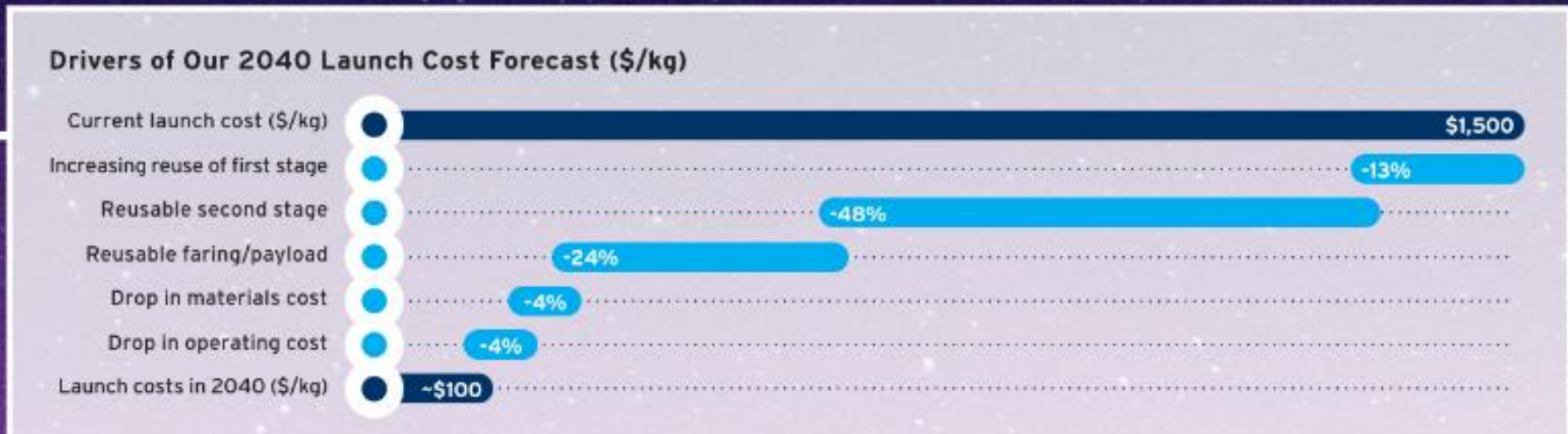
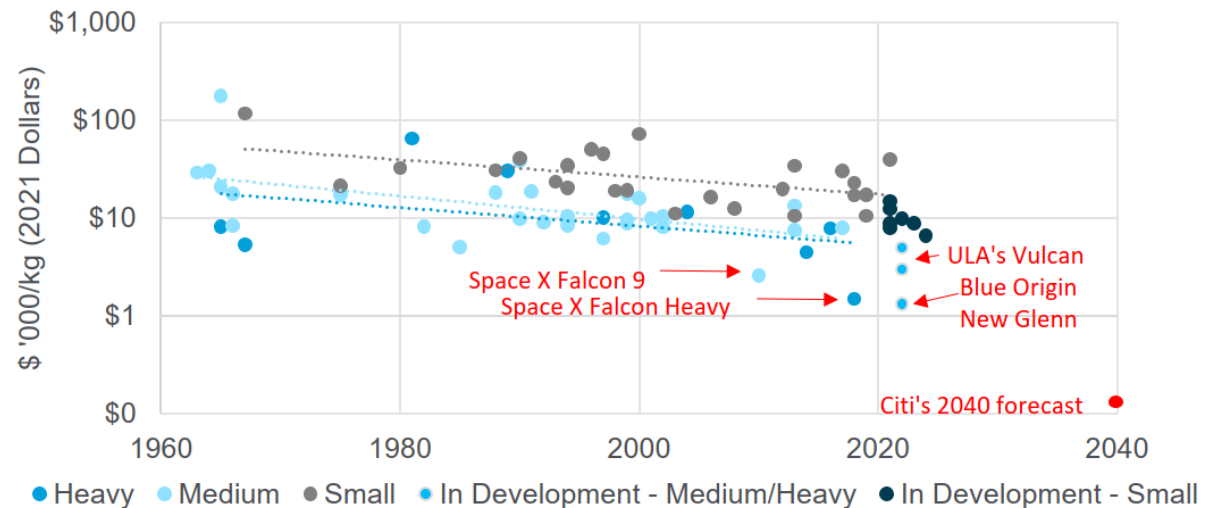


Figure 1. Launch Costs to Low-Earth Orbit (\$ '000s per kg, 2021 inflation-adjusted dollars)



Note: We define small payloads of up to 2,000 kg, medium up to 20,000 kg and heavy greater than 20,000 kg.

Source: Citi Research, Various websites/press articles

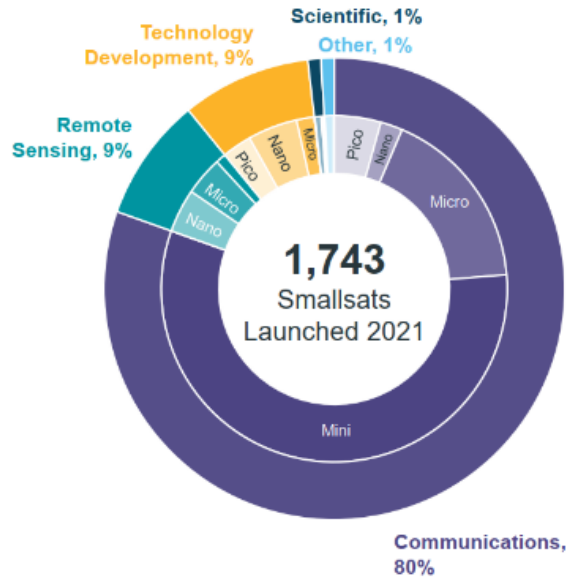
Satellituppsändning

Växande, attraktiv marknad med mellanrisk

Figure 39. Attractiveness and Forecasts for Each Industry in the Space Ecosystem

		Market Value 2020 (\$bn)	Market Value 2040 (\$bn)	CAGR (2020-2040)	Margins (2020)	Margins (2040)	Barrier to Entry	Risk	Overall Attractiveness
Satellite Manufacturing		12	43	6.5%	\$	\$	High	Low	+
Launch Services		5	19	6.5%	\$	\$\$	High	Medium	+
Ground Equipment	Consumer Equipment (e.g. Satellite, TV, Radio, Broadband, and Mobile)	18	18	0.0%	\$\$	\$\$	Medium	Low	-
	GNSS Equipment (Chipsets and Navigation Devices)	103	464	7.8%	\$\$\$	\$\$\$	Medium	Low	+
	Network Equipment	14	10	-2.0%	\$\$	\$\$	Medium	Low	-
Satellite Services	Television	88	59	-2.0%	\$\$\$	\$	Medium	Medium	-
	Satellite Radio	6	29	8.0%	\$\$\$	\$\$\$	Medium	Medium	++
	Broadband	3	15	8.6%	\$\$	\$\$\$	Medium	Medium	++
	Fixed	16	16	0.0%	\$\$\$	\$	Medium	Medium	-
	Mobile Connectivity	2	8	7.0%	\$	\$\$	High	Medium	+
Earth Observation		3	17	10.0%	\$\$	\$\$	High	Medium	++
Government Space Budgets		99	217	4.0%	\$\$	\$\$	High	Low	++
New Applications	Commercial Space Station	-	8	N/A	-	\$\$	High	Medium	++
	Space-Based Solar Power	-	23	N/A	-	\$\$	Low	High	+
	Space Exploration	2	11	10.0%	-	\$	High	Medium	+
	Moon/Asteroid Mining	-	12	N/A	-	\$\$	Low	High	+
	Space Logistics	-	21	N/A	-	\$\$	Low	High	+
	Space Tourism & Inter- City Travel	-	8	N/A	-	\$\$	Low	High	+
	Microgravity R&D and Construction	-	14	N/A	-	\$\$	Low	High	+

Source: Citi Research



94% of spacecraft launched in 2021 = smallsats

43% of total 2021 spacecraft upmass = smallsats

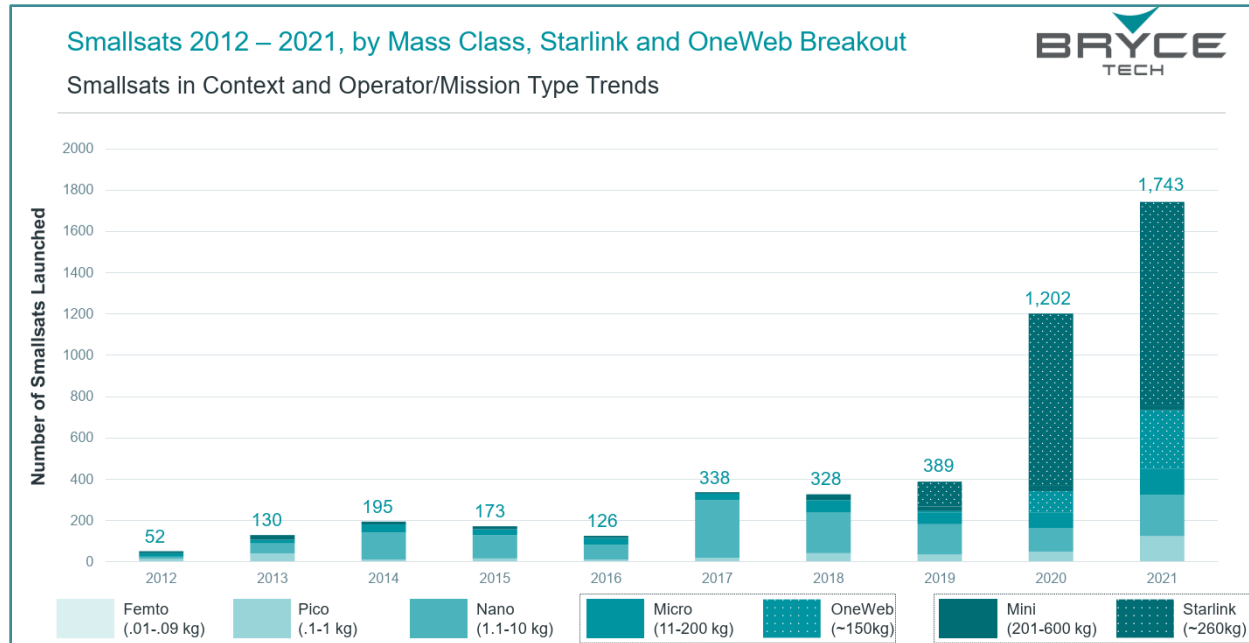
37% of all smallsats in last 10 years launched in 2021 (69% 2020+2021)

80 launches in 2021 carried smallsats

6% of smallsats launched on small/micro launch vehicles in 2021

2

Figurer från Bryce Tech studie "Smallsats by the Numbers 2022"



Var satelliter kan skjutas upp idag

Kommande åren:

Sverige

Norge

UK

Australien?

Portugal?

Brasilien?

....



Sweden to host Europe's first satellite launch station

“That is sure to position Sweden as a pioneer in the space industry”

TheMayor.EU



ESRANGE

Ger Sverige unika möjligheter
att utveckla rymdverksamhet
på många sätt.

Även en mycket viktig
strategisk tillgång.



Men raketer behövs!





LAUNCH ANYTIME FROM ANYWHERE

EIGER ROCKET

Top ten finalist rocket design in the DARPA launch challenge. Low-cost, highly responsive launches from Earth and unique mobility in space.

 PLANT BASED & CARBON NEUTRAL PROPELLANTS

 150 KG TO LEO - \$1.5M




- “Top 10 Space Tech Solutions Provider 2022” av Aerospace and Defense Review
- Planer 2023:
 - Kontrollerade hopp med sidflyttning i Nevada
 - 2 suborbital (plus 100km, re-usable) med Eiger Space Q3 (300kg to 300km) på ESRANGE
 - Eiger Orbital första uppskjutning Q4

MARCH 19TH 2022



MICRO-JUMP

Vertical tie-down-test 18 months after initial funding of Asterex engine, Black Magic propellant system, and full-scale Eiger stage one.

-  ASSEMBLED FIRST STAGE & VERTICAL ENGINE FIRING
-  9.7 SECOND FIRING
-  REPEAT OF 10 MPa CHAMBER PRESSURE

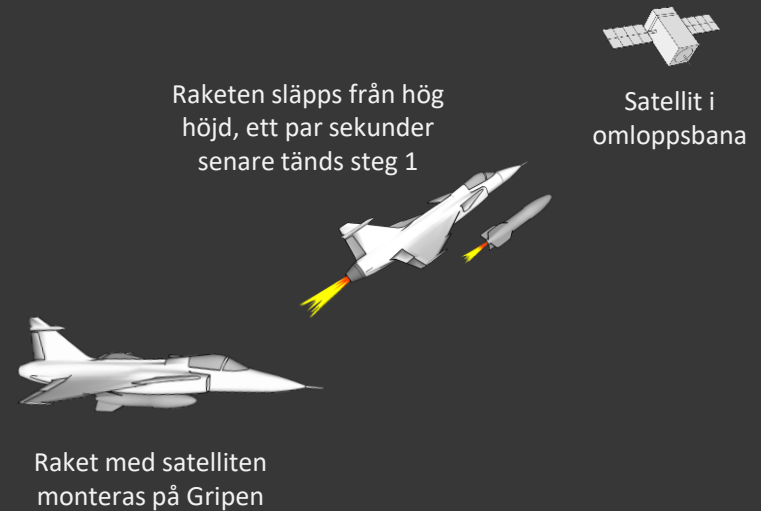
Gripen som uppskjutare av små satelliter

Små satelliter (upp till 25 kg) kan skickas upp av en liten raket, buren av Gripen till hög höjd och med god hastighet

Små modifikationer av Gripen

Ge kunden "Security of supply"

Kan "smyga" upp en satellit



Snabb Flexibel Oberoende

Flexibiliteten i det här systemet finns för närvarande inte NÅGONSTANS

Detta kan vi också göra



Space Tourism: We forecast the market for space tourism could be worth \$1 billion in revenues by 2040, assuming ~4,000 passengers a year travelling to the Karman Line (at a ~\$50,000 ticket price), ~2,500 travelling to the ISS (at a ~\$150,000 ticket price), and ~600 passengers a year travelling to the Moon (at a ~\$650,000 ticket price).