VELTA OPENS
THE NEW PAGE OF TITANIUM HISTORY

CONSTRUCTION OF A PLANT

FOR TITANIUM POWDER AND GOODS PRODUCTION

BASED ON VELTA TI PROCESS

NOVOMYRHOROD

VELTA IS A FEEDSTOCK PRODUCER AND THE ONLY PRIVATELY OWNED COMPANY IN UKRAINE, WHICH HAS BUILT A MINING AND PROCESSING COMPLEX FROM SCRATCH

- Founded in 2007
- 2% of titanium feedstock market share
- ~$45M annual turnover
- 5,6M tons of ilmenite ore resource base, as of January 2021
- Sufficient resource base for the next 19 years
- Supplies to Europe, USA, Asia
- 650+ employees
- 4 years of successful research at own R&D center
- 2 domestic patents and priority in USPTO (USA)
- Revolutionary titanium production method decreased the cost of titanium goods manufacturing 3- to 4-fold.
- Velta designs a pilot plant for titanium goods production with capacity of 5,000 ktpa.

TITANIUM IS THE METAL OF THE FUTURE, STARTING RIGHT NOW

Titanium has unique properties

STRONG AND LIGHT-WEIGHT
Higher strength than the majority of steel alloys, and 45% lighter

HARD
12 times harder and 6 times stronger than aluminum

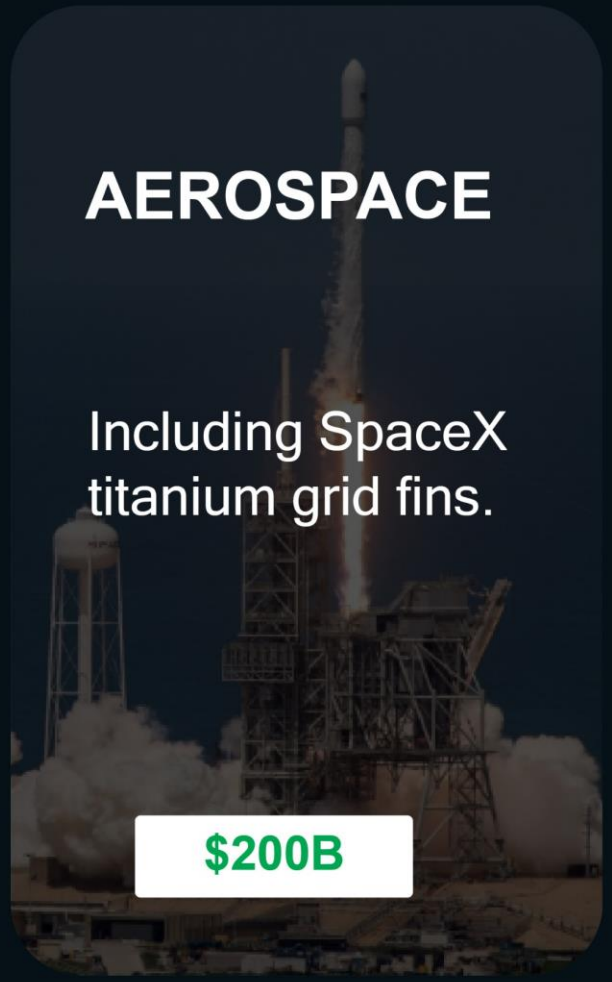
RESISTS AGGRESSIVE ENVIRONMENTS
Has a high corrosion-resistance (can be used in seawater or chlorine)

RESISTS EXTREME TEMPERATURES
Has a high melting point at 1,668°C and stays strong at 650°C

FULLY BIOCOMPATIBLE
Non-toxic and perfectly implants into human body

TITANIUM IS THE METAL OF THE FUTURE, STARTING RIGHT NOW

Titanium was tested by quality-demanding industries, which have historically advanced the progress



AEROSPACE

Including SpaceX titanium grid fins.

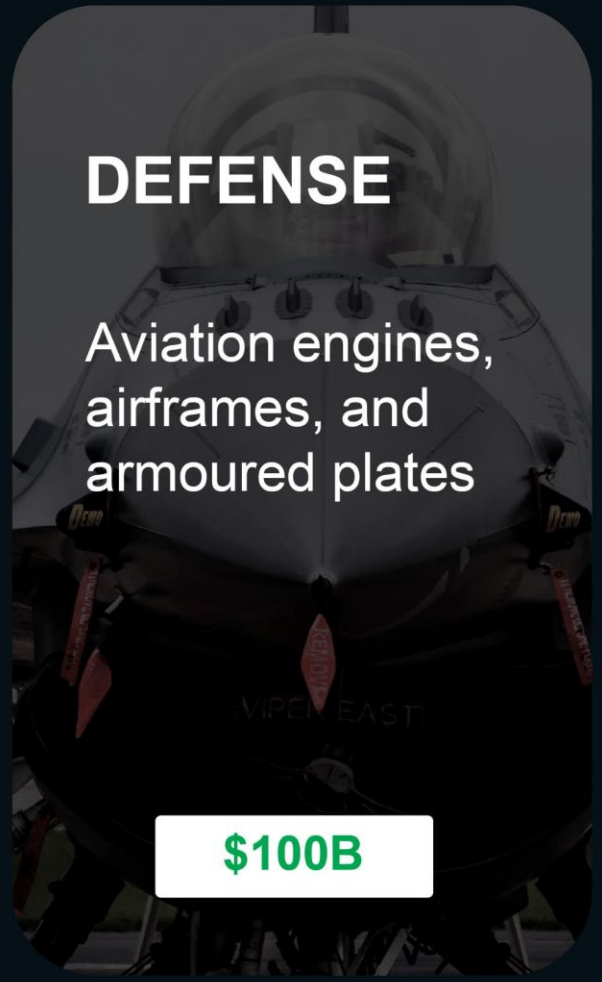
$200B

MEDICAL

Surgical implants

Replaceable components serve up to 20 years!

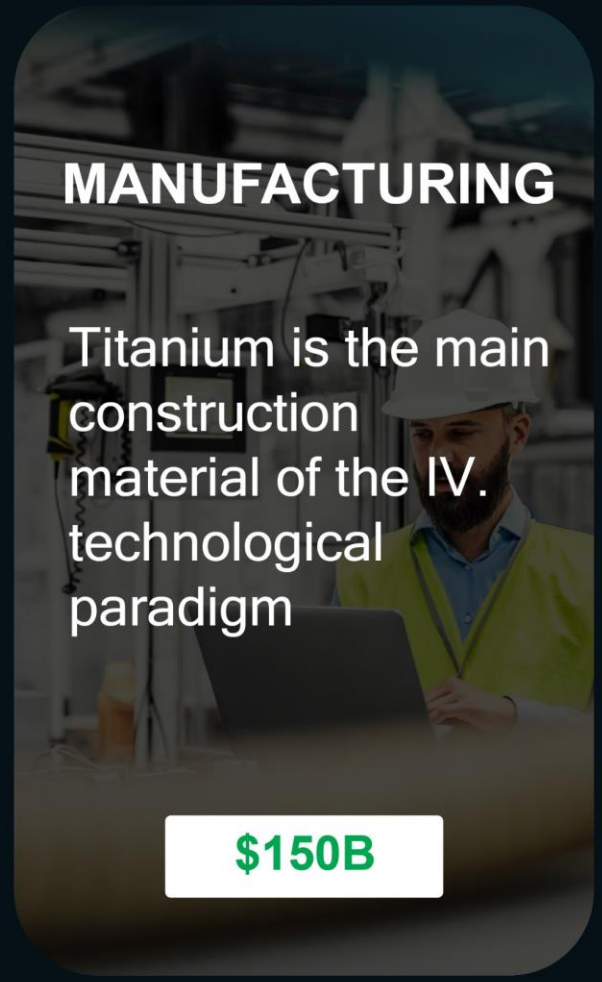
$30B



DEFENSE

Aviation engines, airframes, and armoured plates

$100B



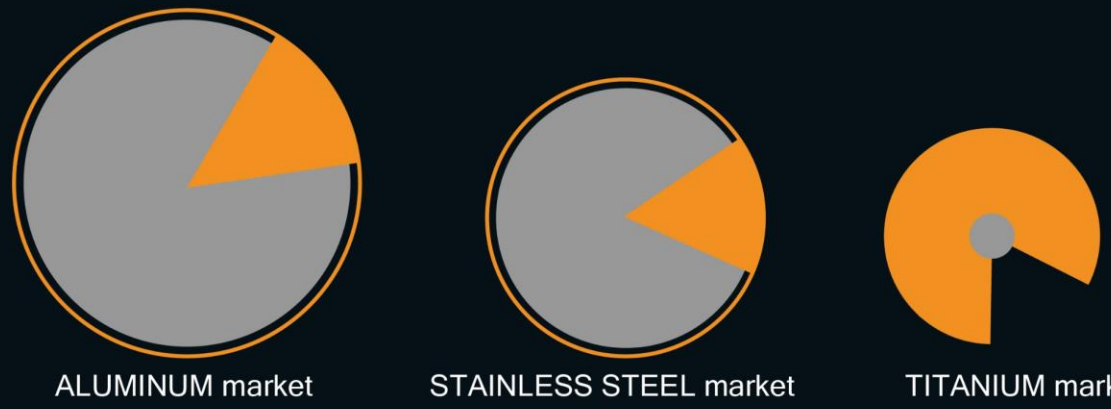
MANUFACTURING

Titanium is the main construction material of the IV. technological paradigm

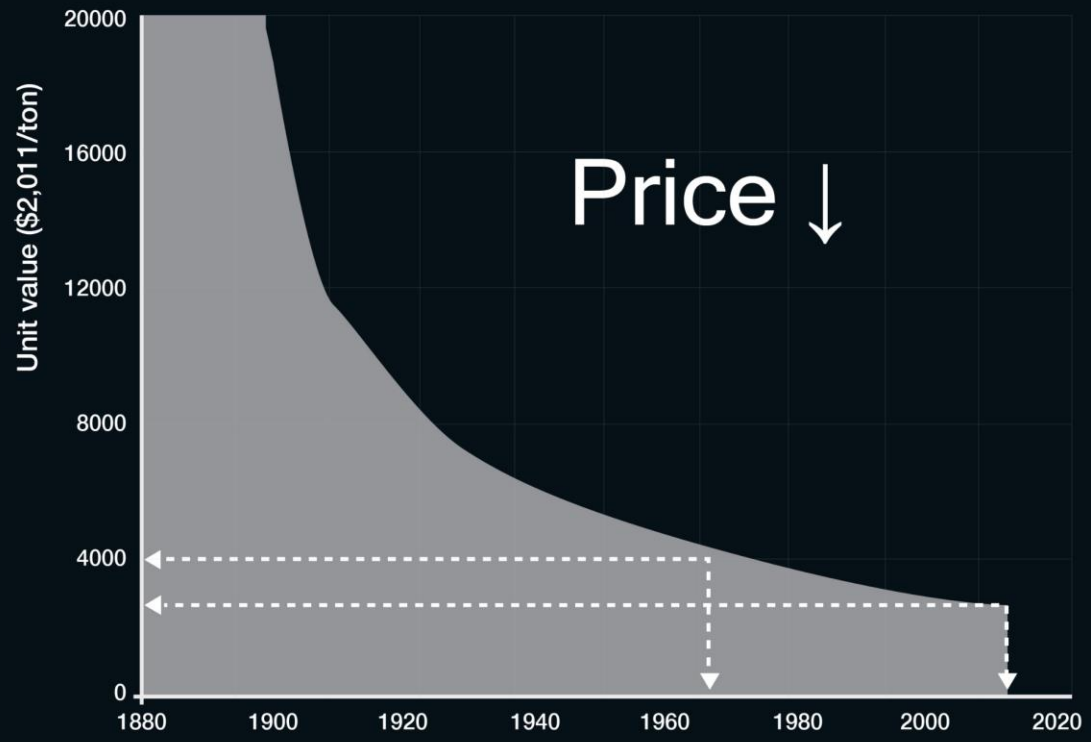
$150B

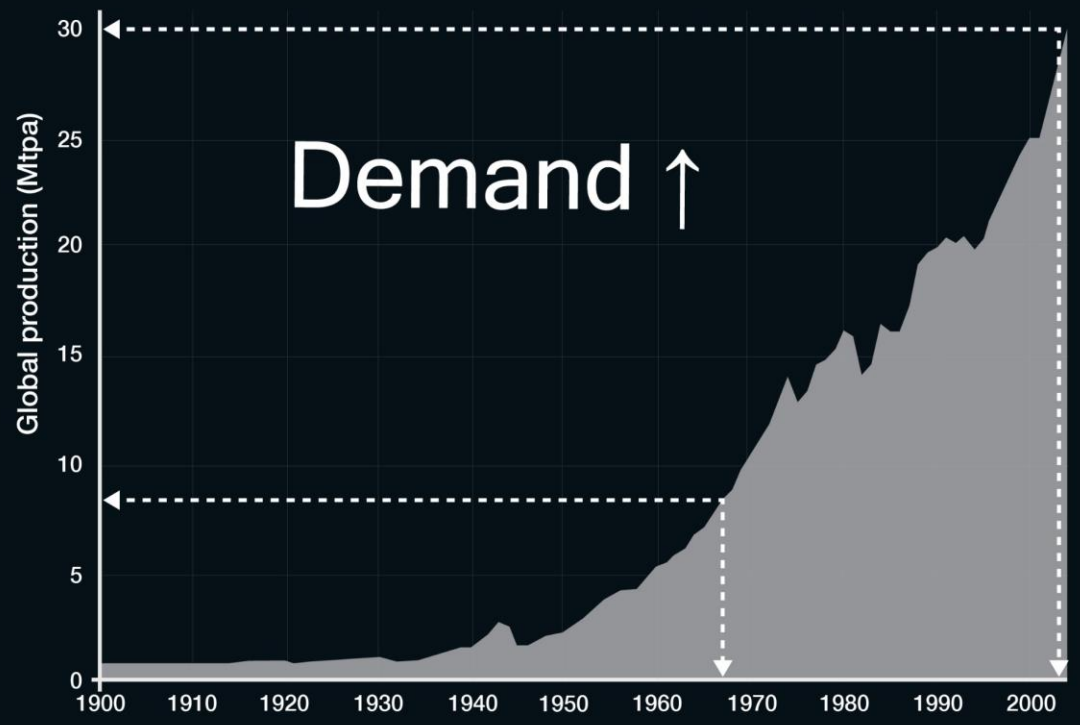
THE ONLY BARRIER TO THE EXPANSION OF TITANIUM APPLICATION IS THE HIGH-COST, ECOLOGICALLY UNFRIENDLY AND OUTDATED PRODUCTION TECHNOLOGY

VELTA'S INNOVATIVE TECHNOLOGY IS GREEN AND REDUCES THE COST OF TITANIUM 3- TO 4-FOLD.
IT WILL LEAD TO AN EXPLOSIVE GROWTH IN DEMAND FOR THIS METAL



ALUMINUM, WHICH USED TO BE AN EXOTIC AND PRECIOUS METAL, CURRENTLY DOMINATES THE MARKET





NEW TECHNOLOGY

The Kroll Process

Products — Ilmenite 56% TiO_2 — Process

01 Electric remelting

Titanium slag (85% TiO_2) +Cast iron

02 Chlorination and purification
At a temperature of 700-900°C

Titanium tetrachloride ($TiCl_4$) +Waste

03 Reduction through Mg
At a temperature of 1000°C (several days)

Titanium metal +$MgCl_2$ +Waste

04 Distillation $MgCl_2$
At a temperature of 900°C (several days)

Titanium

05 Hydrogenation

06 Titanium hydride grinding

07 Dehydrogenation

Titanium metal powder

Velta Ti Process

Products — Ilmenite 56% TiO_2 — Process

01 Hydrometallurgy
Maximum temperature 120°C

i-Synrutile (99,5% TiO_2)
+ Iron oxide pigments
+ Paint filler
+ Mineral fertilizers
+ Additive for metallurgy
+ PCC

02 Dehydration and decarbonization
At a temperature of 900°C

i-Synrutile (>99,5% TiO_2)

03 Direct reduction from oxide to titanium metal

04 Purification of reaction by-products

Titanium metal powder

- ∅ No solid or liquid waste
- ∅ No aggressive environment above 120°C
- ∅ No Cl_2

- ✓ 2 times **faster**
- ✓ 4 times **cheaper**
- ✓ High value-added by-products

STEPS OF VELTA TI PROCESS

- **The cost of titanium, obtained with the new method, is 3- to 4-times lower compared to the Kroll process**
- **For the past 30 years, Japan, Great Britain, USA, South Korea, and Australia have been trying to invent the new method of cheaper titanium production**

Ilmenite - titanium ore - from Velta's Birzulivske deposit

Intermediate raw material – i-synrutile

Titanium powder

Rolling, stamping of finished products or spheroidization of powder to obtain finished products by additive technologies

Final goods

PROJECT DESCRIPTION

- Revolutionary patented technology
- Re-industrialization: industrial titanium complex will be built at the site of the Novomyrhorodska coal mine, closed 25 years ago
- Zero-waste concept: Velta’s technology does not generate any waste or emissions
- Own resource base is located only in 15 km
- Equipment suppliers: General Electrics, Dr. Mueller AG, Mecalux, SACM
- The project is easy to scale anywhere in the world
- Production process creates high value-added by-products

PRODUCTION OF FINAL TITANIUM GOODS
ANNUAL CAPACITY: UP TO 5,000 TONS

		Volume of global market
2,470 tons	Goods for shipbuilding, chemical, defense, and automotive industries. Heat exchangers, exhaust systems, valves, pump blades, hatch covers for military equipment, metalware	over $500B
830 tons	Medical items. 30 product types and sizes. Hip and knee implants, various fasteners, dental implants, titanium medical tools	$30B
700 tons	Spheroidized titanium powder for 3D printing	
500 tons	Cases for electronic equipment. 15 product types and sizes. Mobile phones, laptops, watches, tablets.	$32.6B
500 tons	Armoured plates. Personal protection for the military personnel and armoured vehicles.	$1,6B

HIGH VALUE-ADDED BY-PRODUCTS

173 000 tons	Mineral fertilizers (ammonium sulphate)
44 400 tons	Paint and coatings (precipitated calcium carbonate)
32 000 tons	Sulfuric acid
11 500 tons	Magnesium hydroxide
11 000 tons	Iron oxide pigments (red, black)
7 000 tons	Aluminum hydroxide
3 000 tons	Liquid oxigen
2 350 tons	Construction sludge
2 200 tons	Metallurgical additive

INDUSTRIAL TITANIUM COMPLEX INCLUDES:

Area: 20.4 ha Number of shops: 20 Number of production areas: 50

Production of i-synrutile

Production of titanium powder

Final goods production sector

Area of high value-added by-products

Area of raw material, water and technical gases preparation

Area of sulphuric acid production

Area of calcium production

SUMMARY

The global titanium market is growing by 4-6% annually (+ ~20,000 tons). Ukraine is a prominent player due to its own raw material assets and scientific base.

Velta has over 10 years of experience in the production of titanium feedstock, two resource assets and its own patented technology, which allows for obtaining titanium quickly, environmentally friendly, and 3-4 times cheaper than the standard process.

The development of an efficient titanium cluster will allow Ukraine to build partnerships with the United States and Europe, for whom titanium is a strategic metal.

We will make Ukraine a titanium leader!