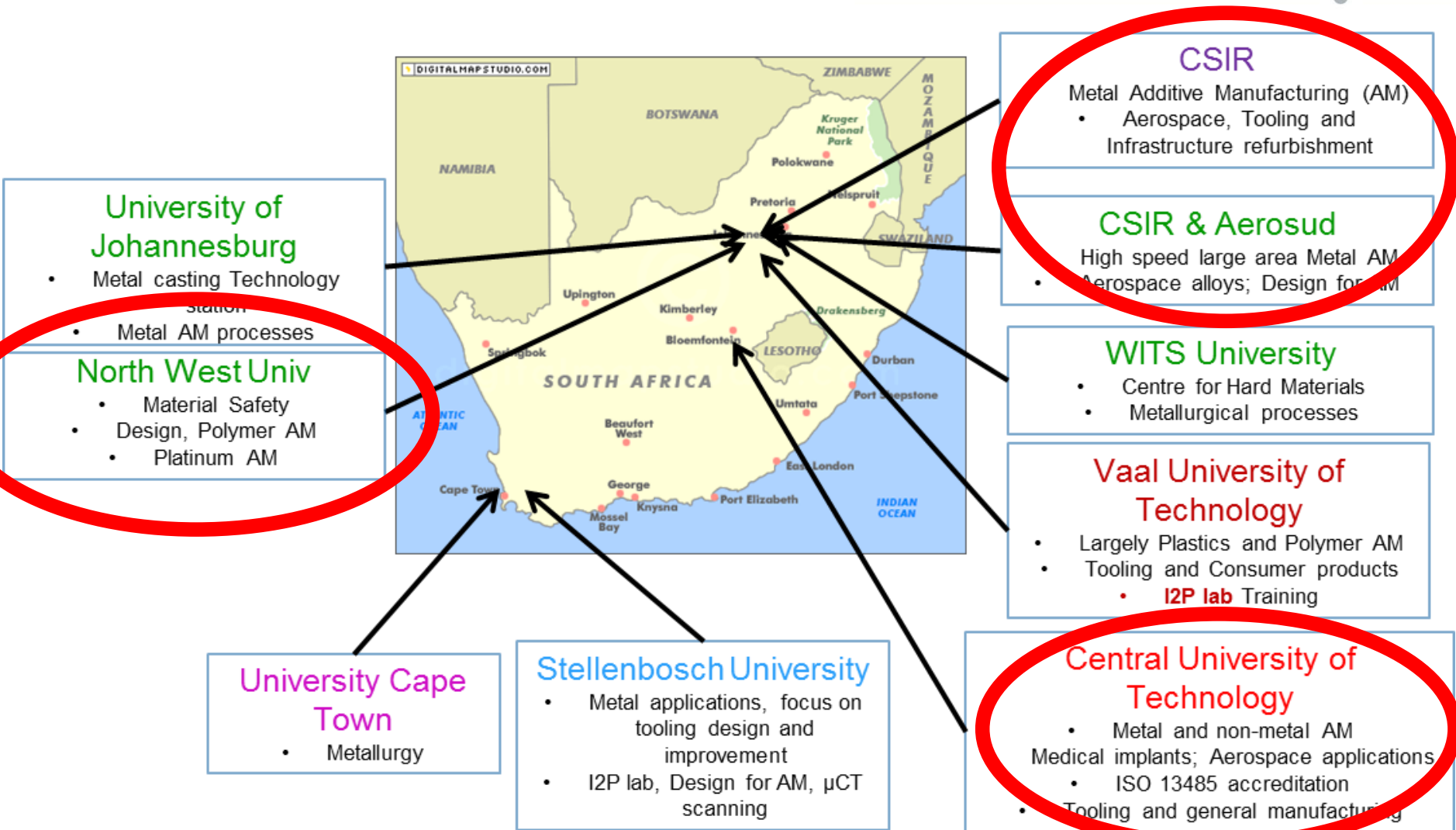


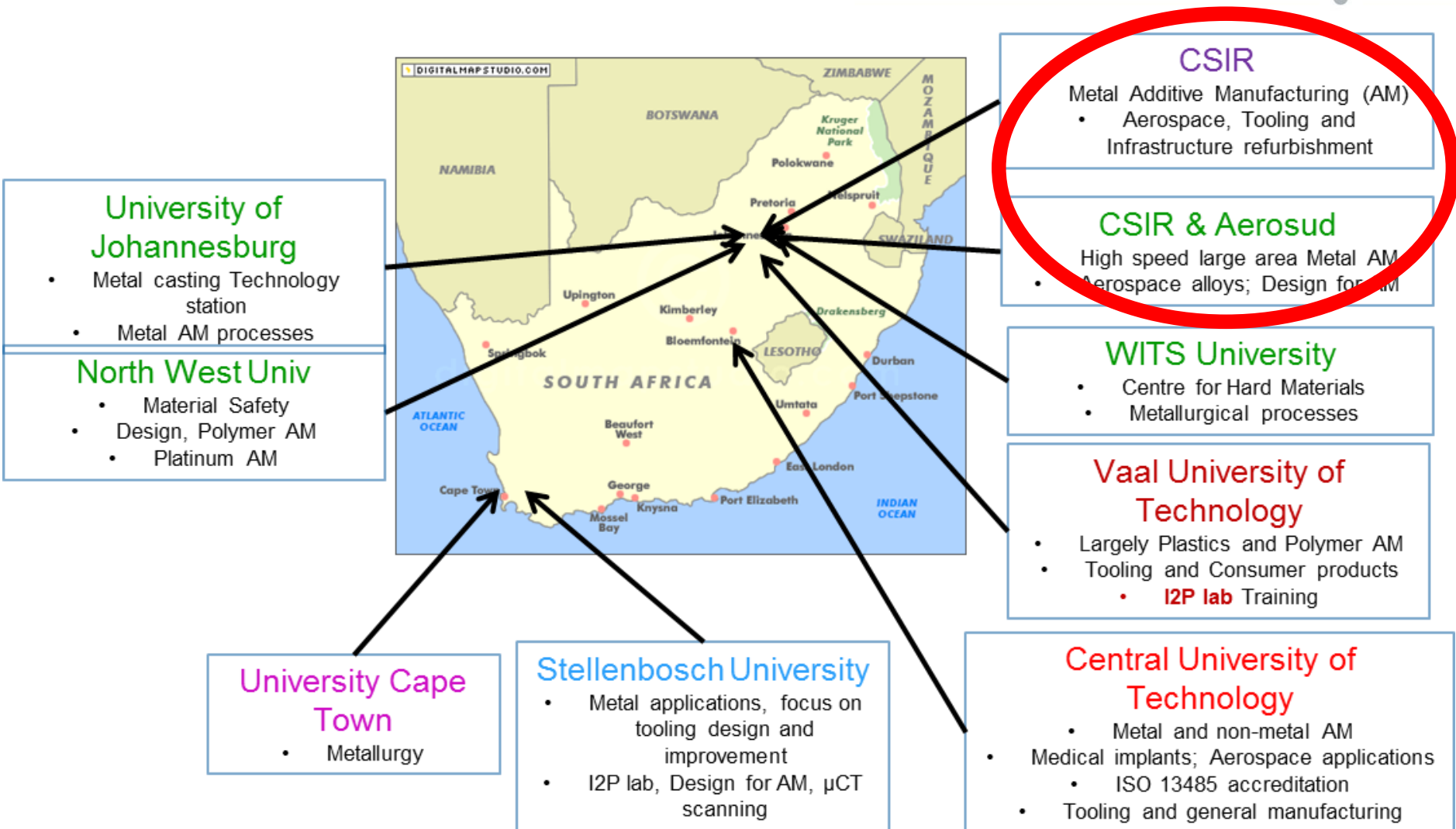
Laser Based Additive Manufacturing in South Africa

Hencharl Strauss
CSIR National Laser Centre
Pretoria
South Africa

Additive Manufacturing in South Africa



Additive Manufacturing in South Africa



The CSIR at a glance

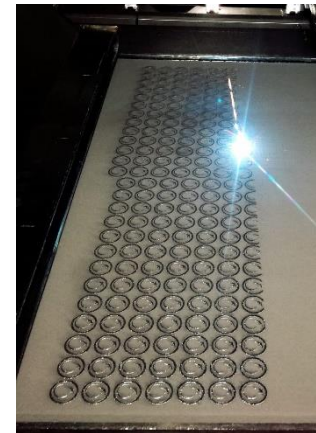
- The CSIR is a science council, classified as a national government business enterprise
- The organisation is 74 years old



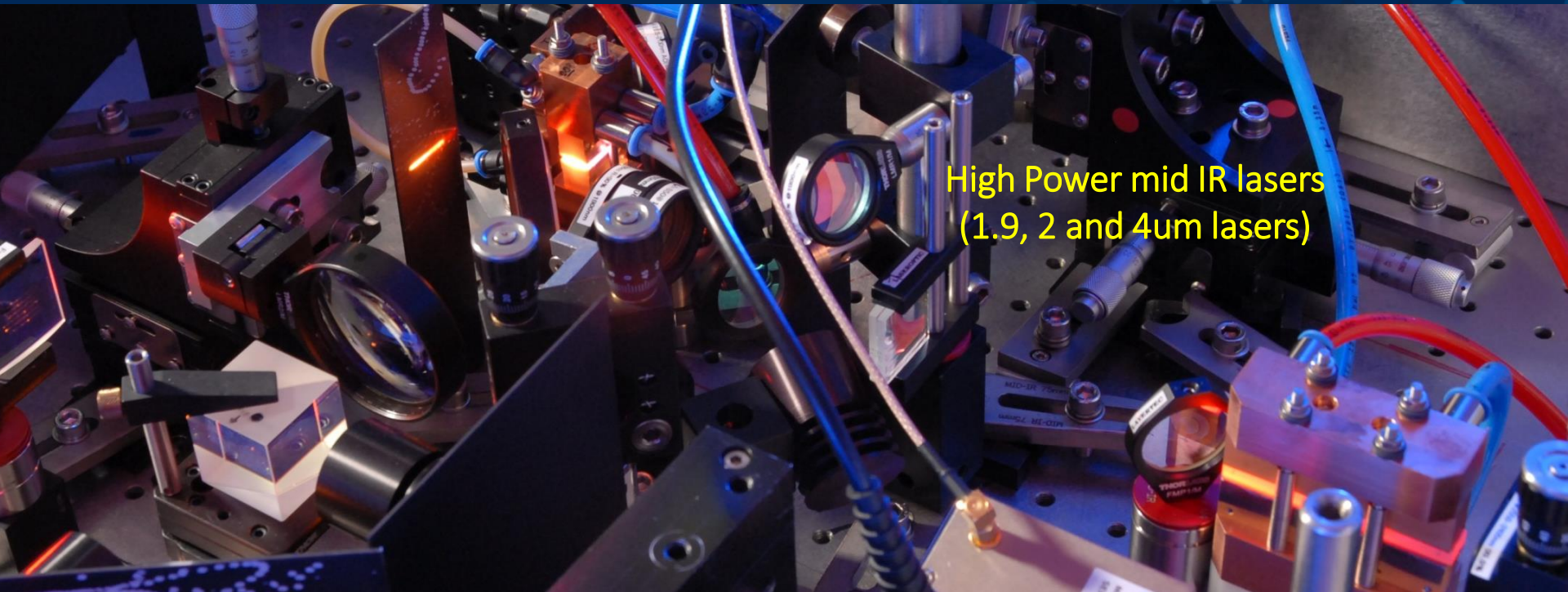
- Total staff: 2 621
- Staff in science, engineering and technology: 1 869
- Staff with PhDs: 335
- More than 2 000 projects
- Multidisciplinary skills set

The National Laser Centre's role in the CSIR

The NLC supports industrial development through laser-related capabilities, technologies and services

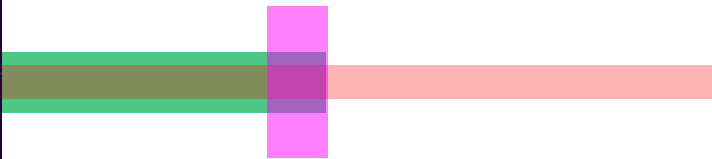
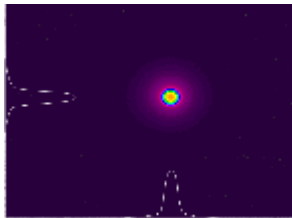


Novel Lasers Group

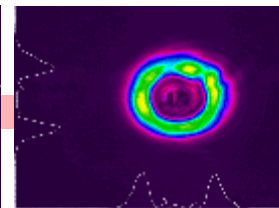
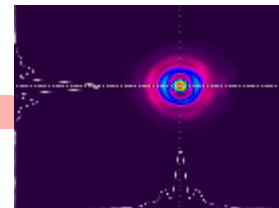


High Power mid IR lasers
(1.9, 2 and 4um lasers)

Kilowatt
Beams shapers



Static & Dynamic
Technologies



CCD

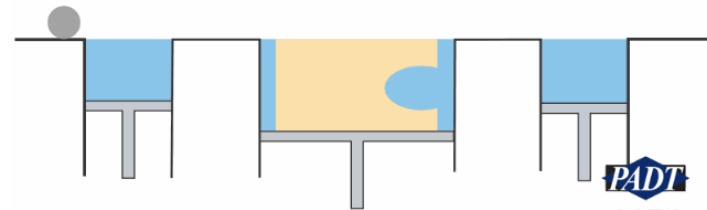


South African developed Metal 3D Printers

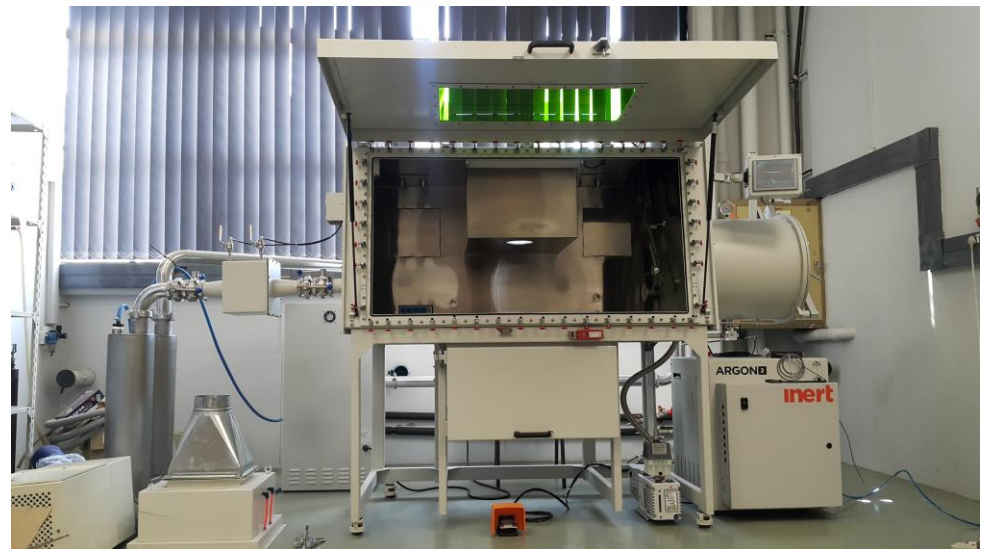
2m x 0.6m x 0.6m



Selective Laser Sintering (SLS)



PADT
www.PADTINC.com

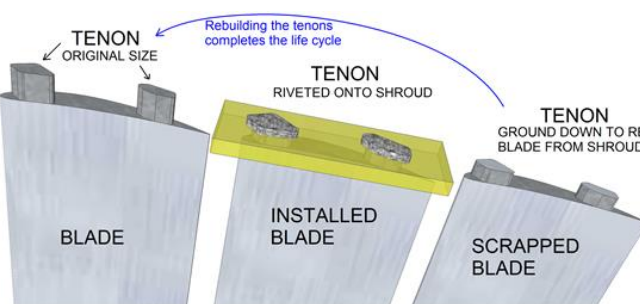
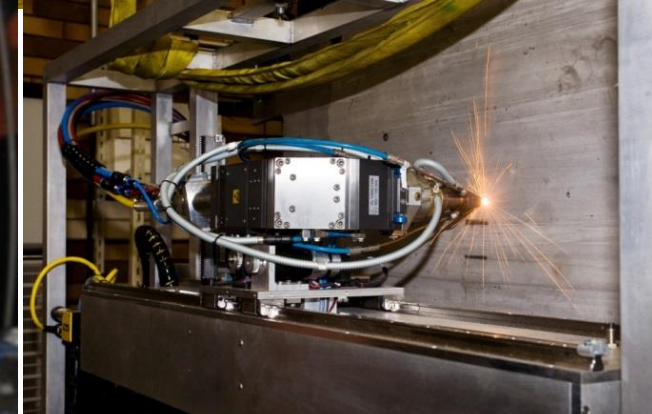
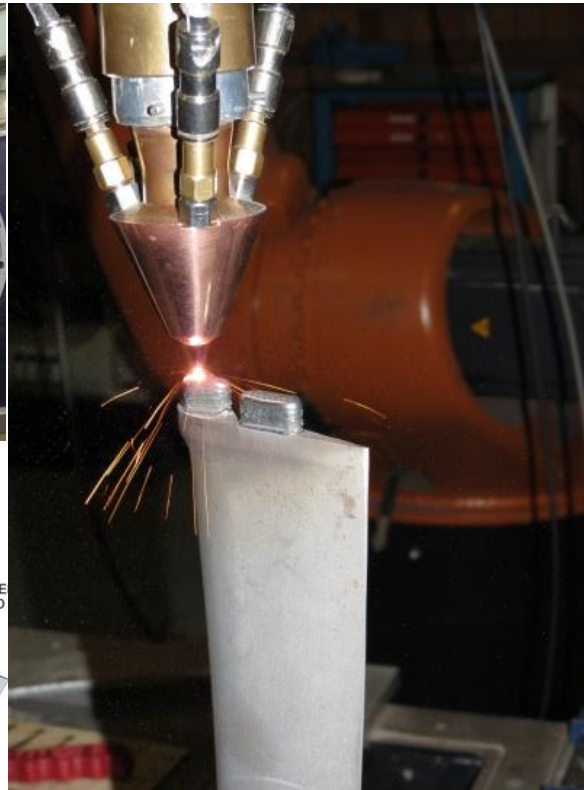
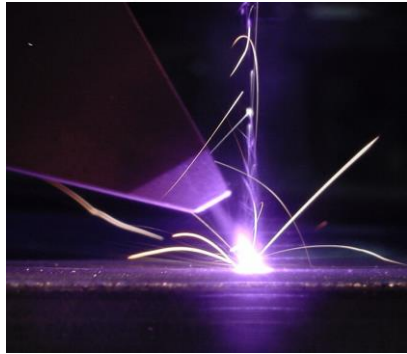
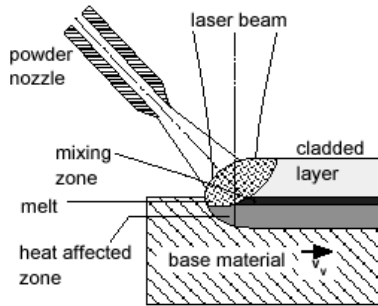


Ø0.4m x 0.2m

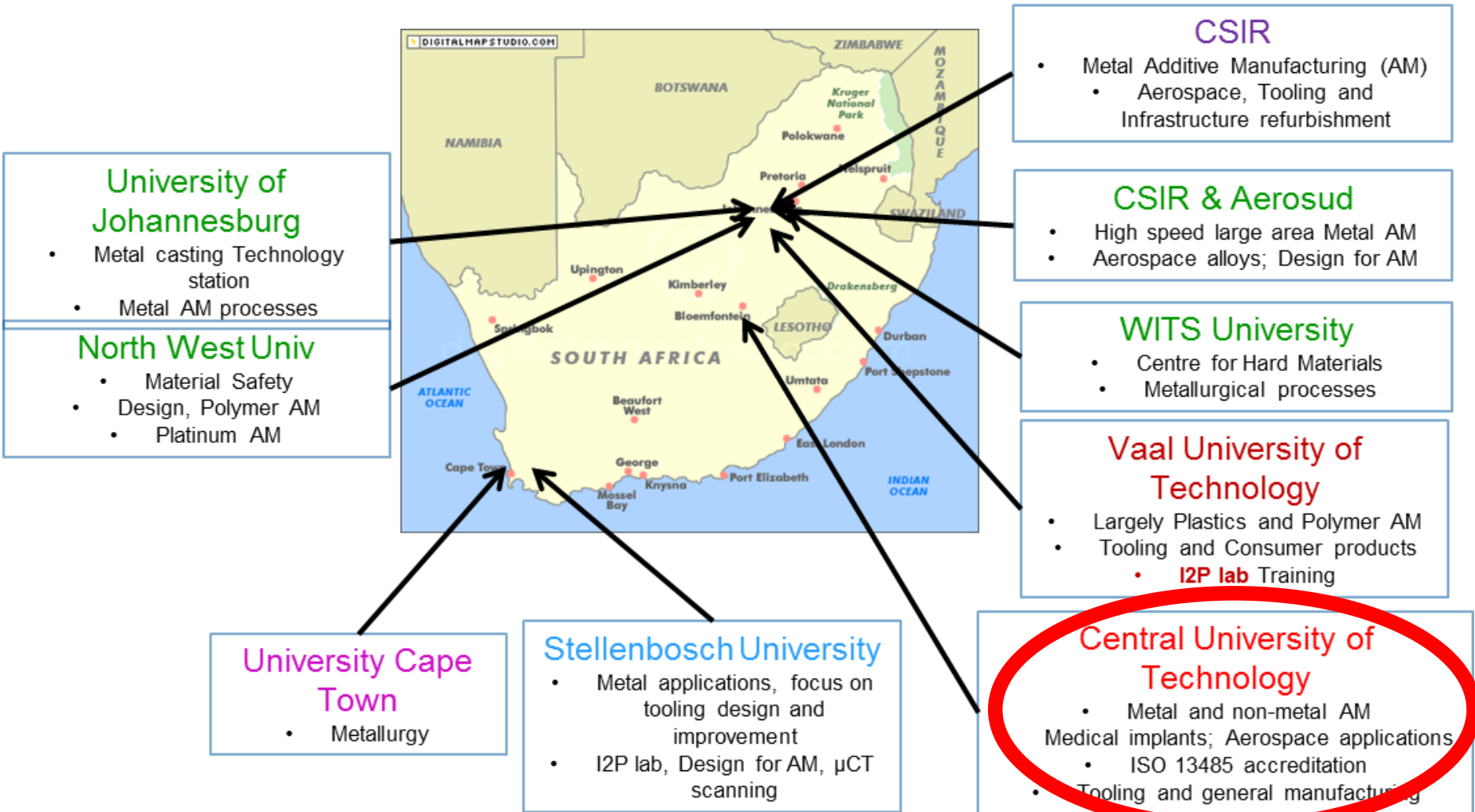
Titanium Aerospace Parts



Powder Blown Additive Technologies

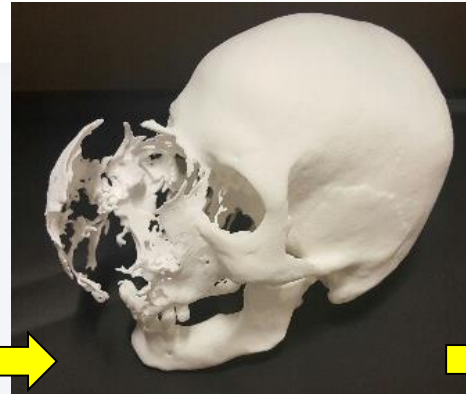


Additive Manufacturing in South Africa



Medical Implants using AM

MAXILLARY PATIENT



Female patient with Myxoma of the mid-facial region (Kimberley)

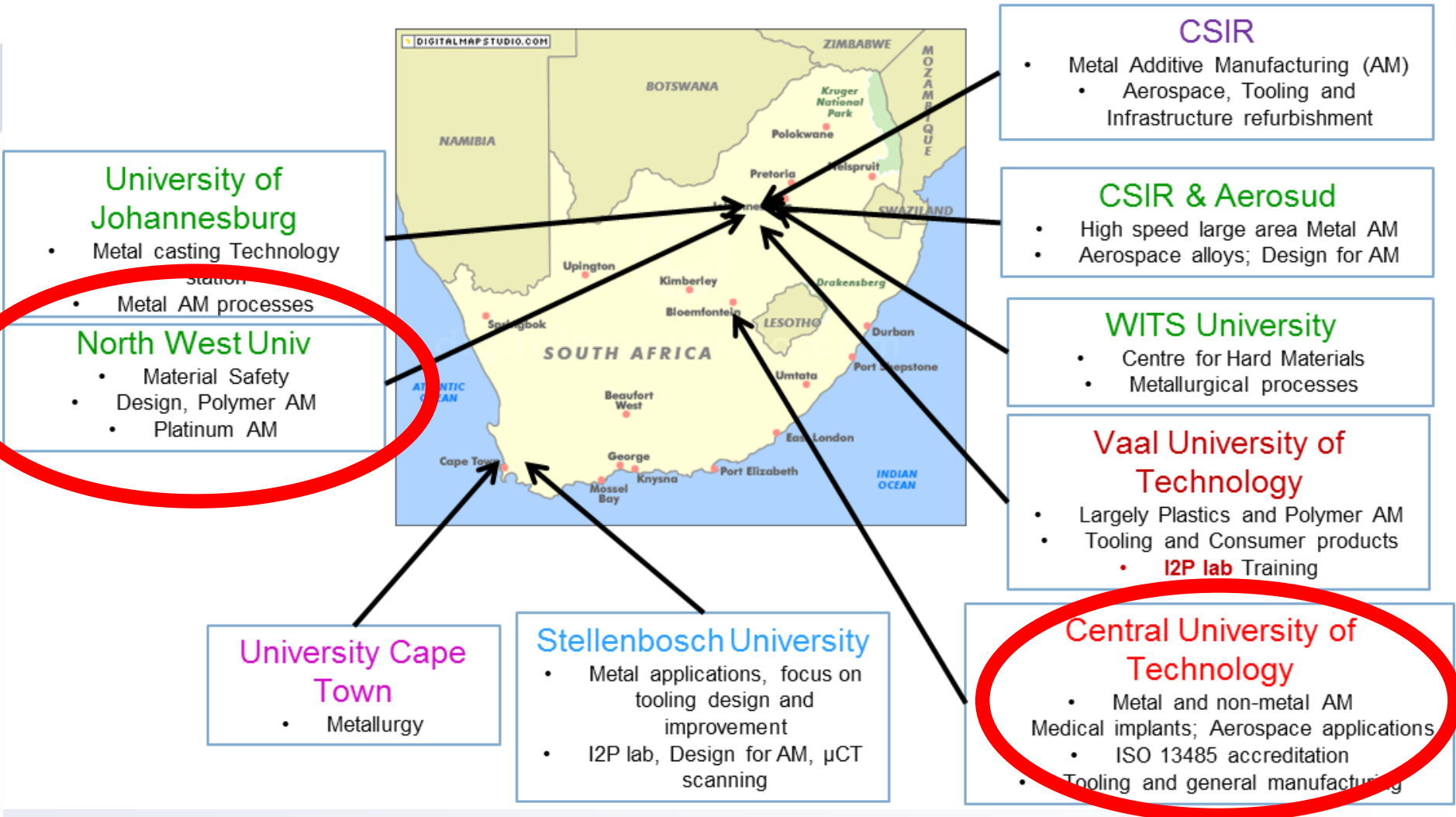
- Customised mid-facial implant design – Materialise software
- Customised LS mid-facial implant in Ti64 printed on EOS M280
- Maxillary frame designed to restore facial profile and symmetry
- Placement of obturator and dental bar restored mastication and speech functionality

ISO 13485 CERTIFICATION

Acknowledgements

Dr K Hoek
Dr W Hoek





New, novel applications for Platinum Group Metals
using additive manufacturing



PlatForum[®]
infinite possibilities

Additive manufacturing of jewelry, specialized implants and
energy and mobility components

✉ 3dprintingplatform@gmail.com



National Resources

Location of the Bushveld Complex, South Africa

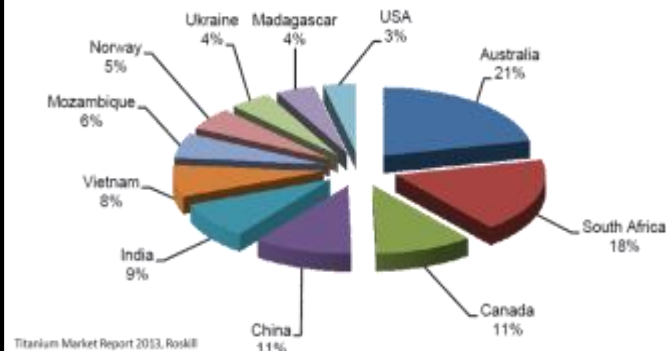


68% of Worlds Platinum

Large ilmenite (FeTiO_2) deposits in SA

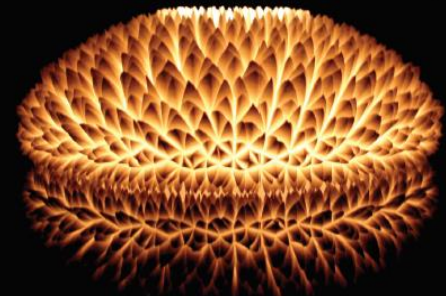


Second largest producer of TiO_2 slag

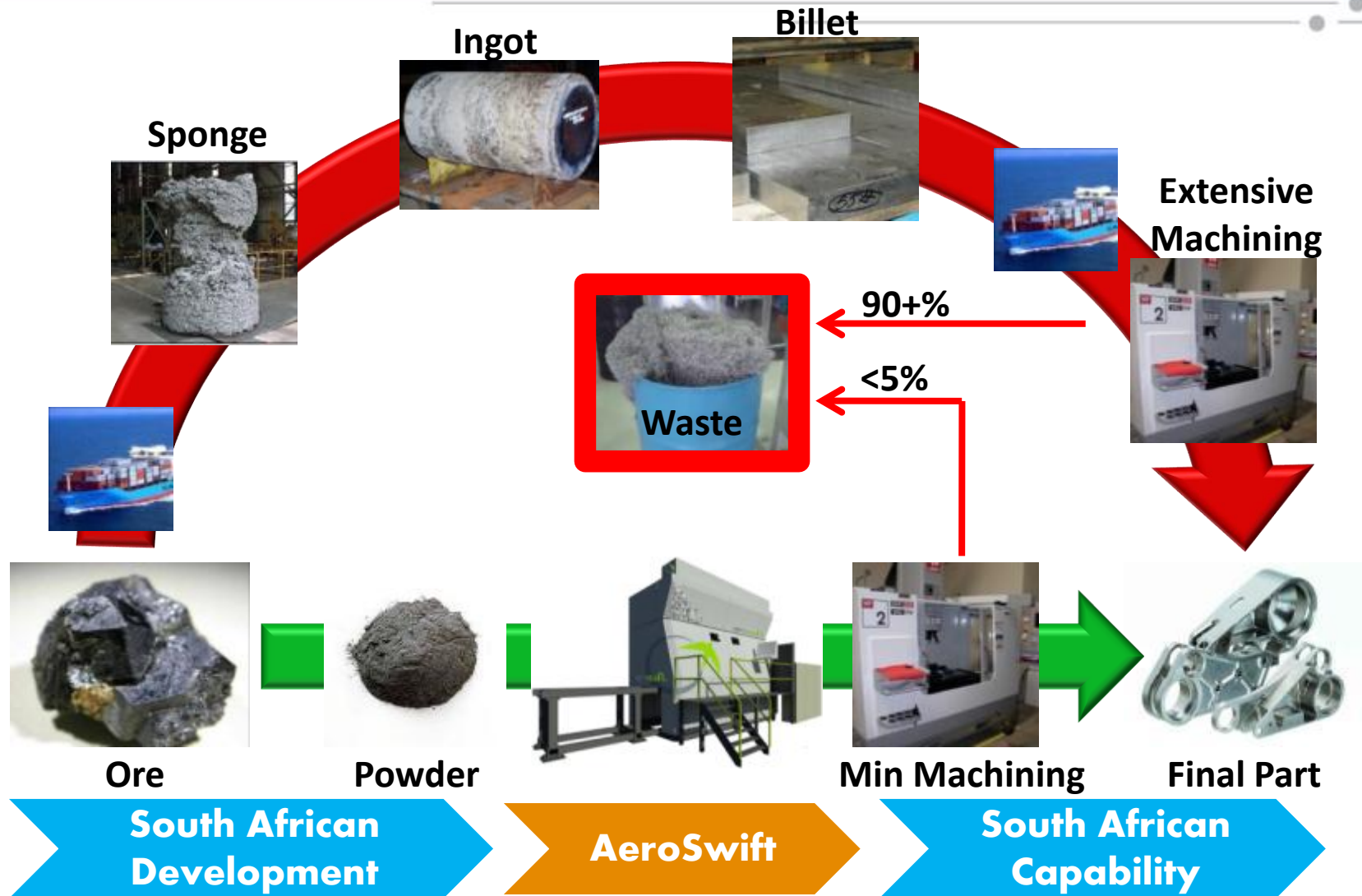


2nd largest global producer of Titanium minerals with a share of 23 % of the world deposits

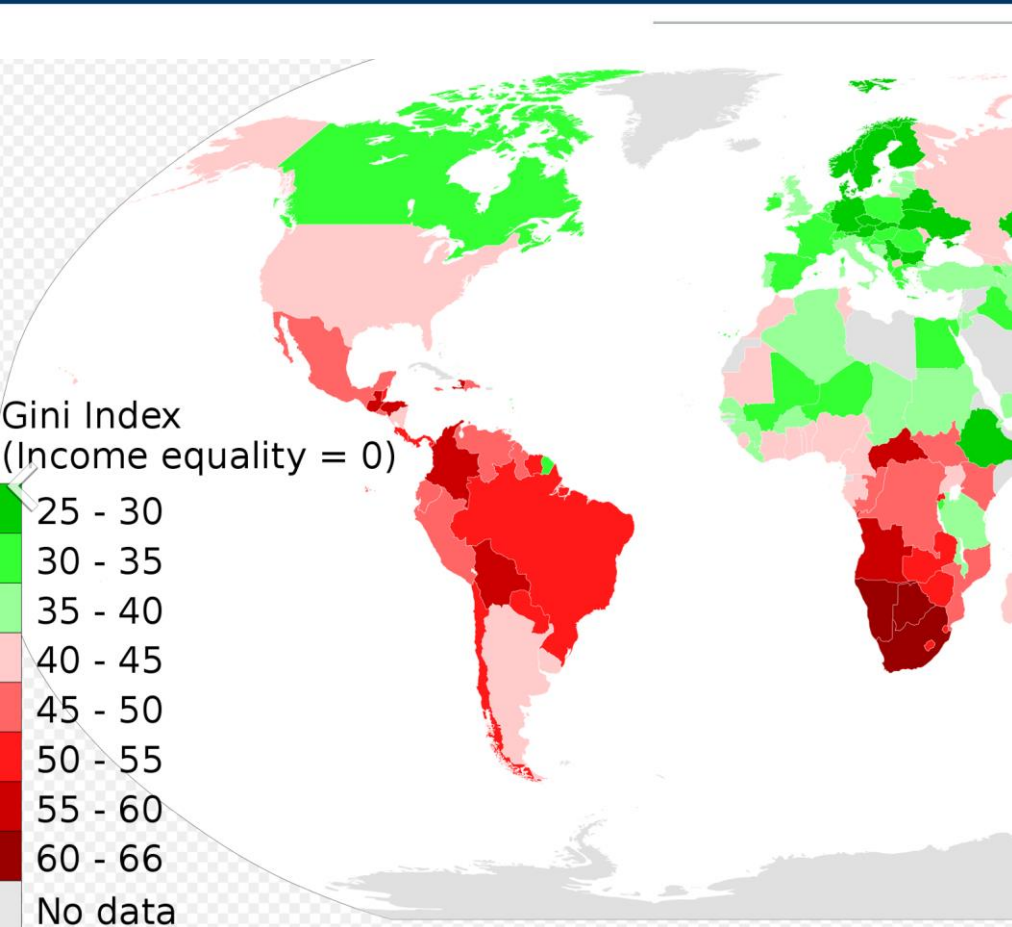
A South African Additive Manufacturing Strategy



Titanium beneficiation



Main Challenge → Inequality

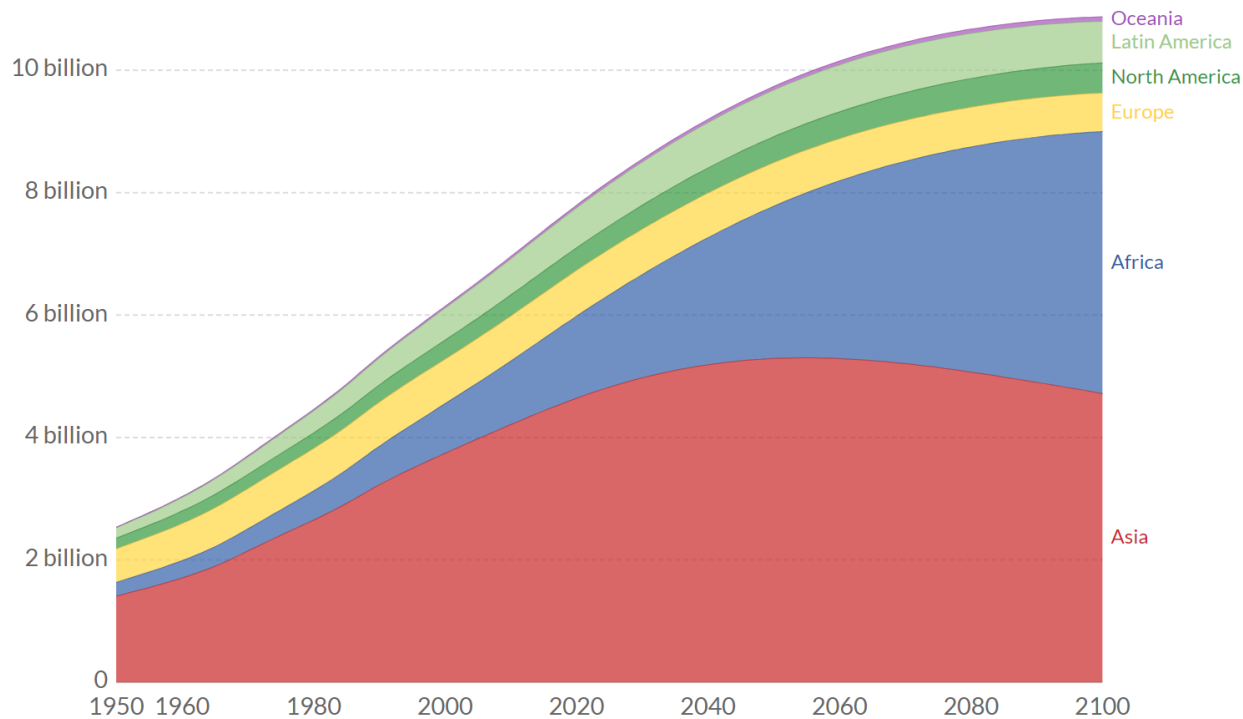


Africa Population Growth

World population by region projected to 2100

Projected population to 2100 is based on the UN's medium population scenario.

Our World
in Data



Source: HYDE (2016) & UN, WPP (2019)

CC BY

☐ Relative

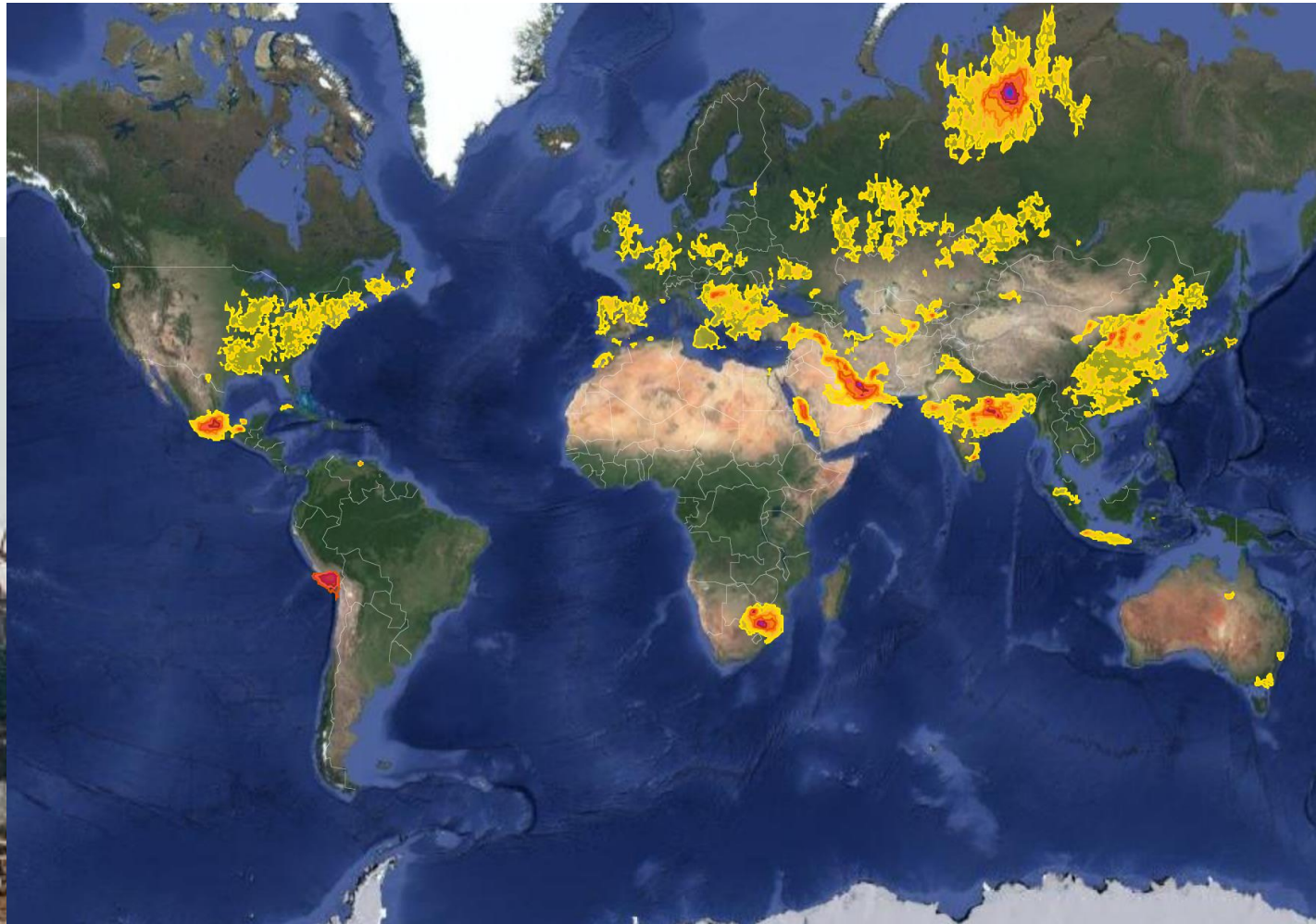
CHART

DATA

SOURCES



Challenges → Energy Generation and Supply

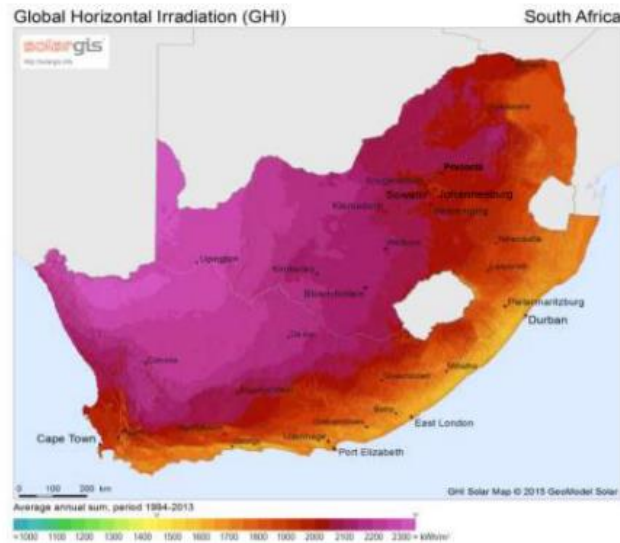


our future through science

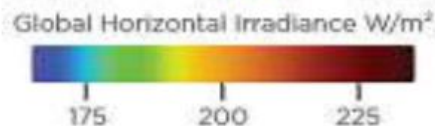
Opportunity → Solar Energy



Solar resource in South Africa...



... as compared to Germany



Towards Clean(er) Production

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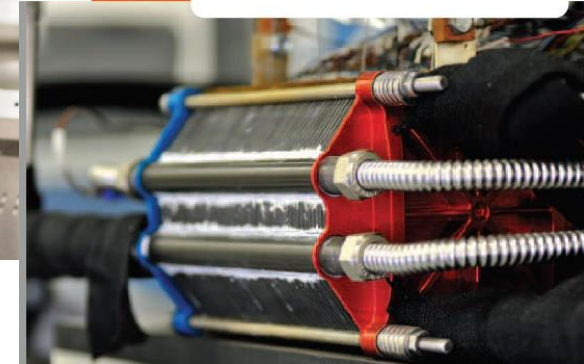


parts for gas turbines. It e-spot production of s models, especially for

CSIR

our future through science

HySA Systems
Hydrogen South Africa



Thank you

Contact: Dr Hencharl Strauss

CSIR - National Laser Centre

Tel: +27 12 841 3122

Cell: +27 76 244 1195

hstrauss@csir.co.za



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