PPMEC | Pós-Graduação em Sistemas Mecatrônicos
Faculdade de Tecnologia
Departamento de Engenharia Mecânica

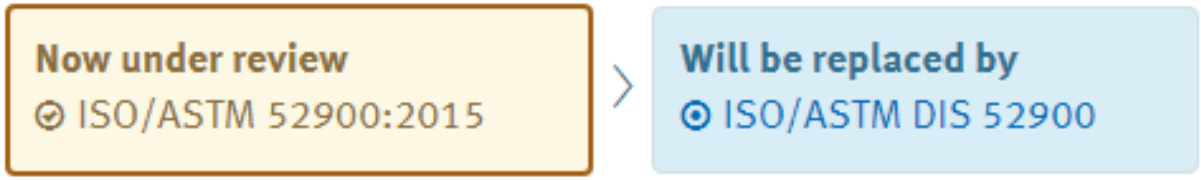
Universidade de Brasília

Manufatura Aditiva: estado atual, tendências e algumas perspectivas

Efraín A. Rodríguez

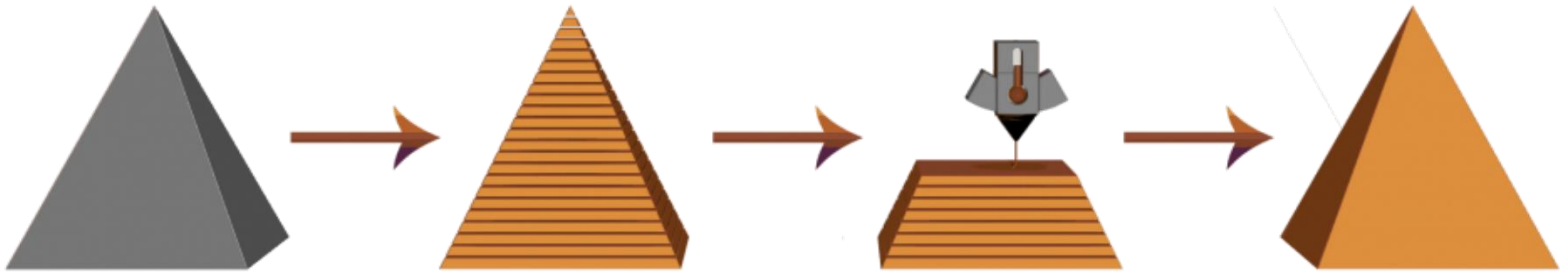
O que é manufatura aditiva (AM-*Additive Manufacturing*) ?

- Impressão 3D
- Protipagem rápida
- Manufatura digital direta



... processo de juntar material para fabricar objetos a partir de um modelo 3D, usualmente camada sobre camada, como oposto aos processos convencionais de manufatura subtrativa e conformação.

Processo de AM



Categorias de processos de AM

- Binder jetting
- Directed energy deposition
- Material extrusion
- Material jetting
- Powder bed fusion
- Sheet lamination
- Vat photopolymerization

Binder jetting

Directed energy deposition

Material extrusion

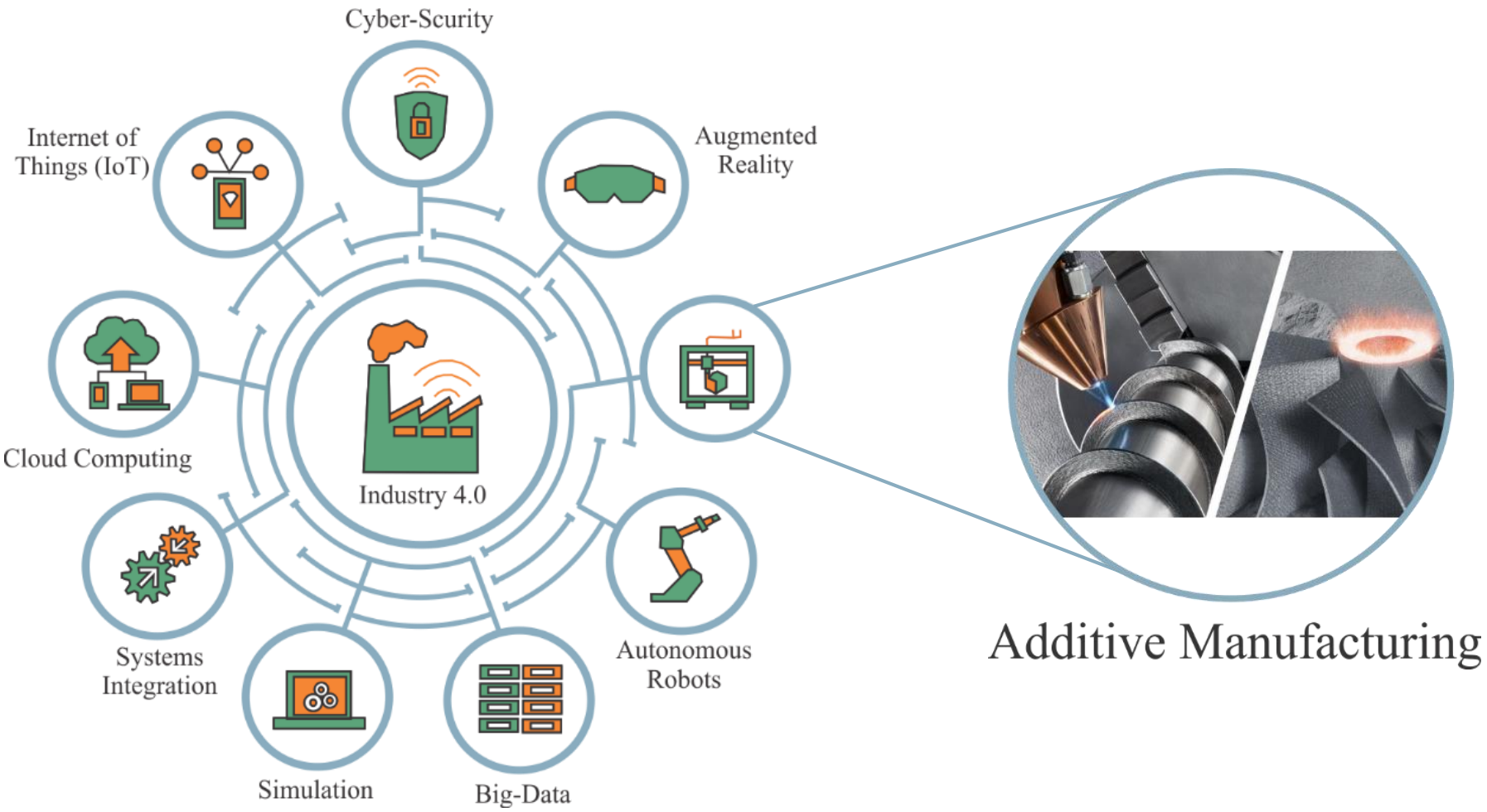
Material jetting

Powder bed fusion

Sheet lamination

Vat photopolymerization

Additive Manufacturing in the new Industry 4.0 landscape

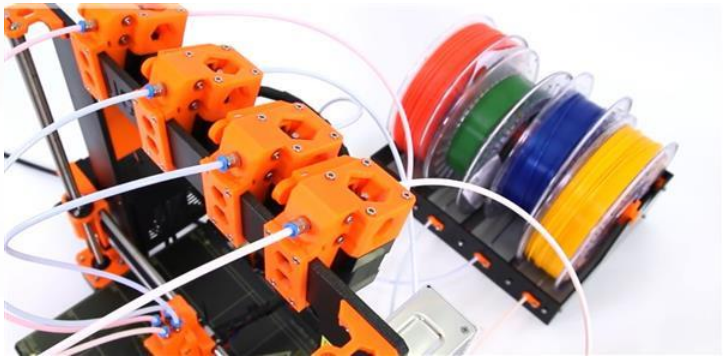


AM as enabler from Industry 4.0

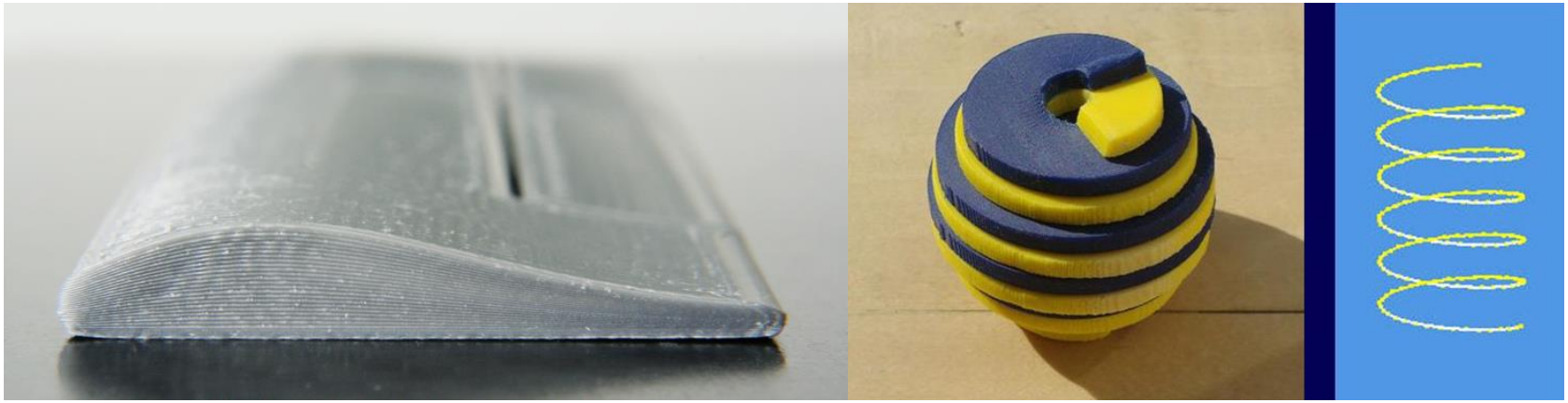
- Parts with complex geometries
- Enable never-before-seen functionally graded multi-material and multi-color parts
- Assemblies can be consolidated into single 3D-printed geometries
- Minimum material waste and without expensive tools
- It enables novel designs for a wide array of applications across aerospace, defense, medical industries, among others.

Hybrid additive-subtractive manufacturing

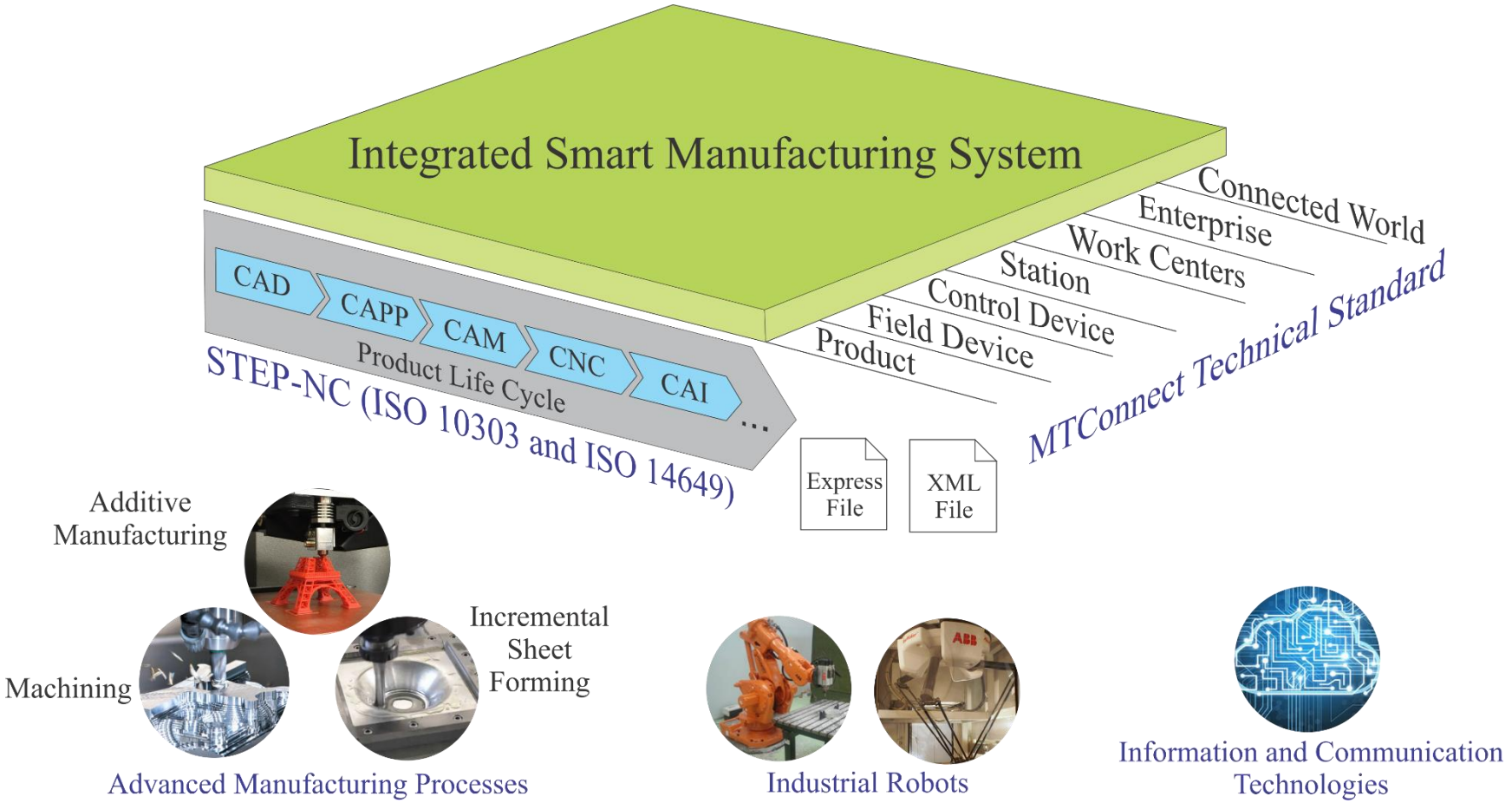
Impressão 3D multi-material e multi-cor



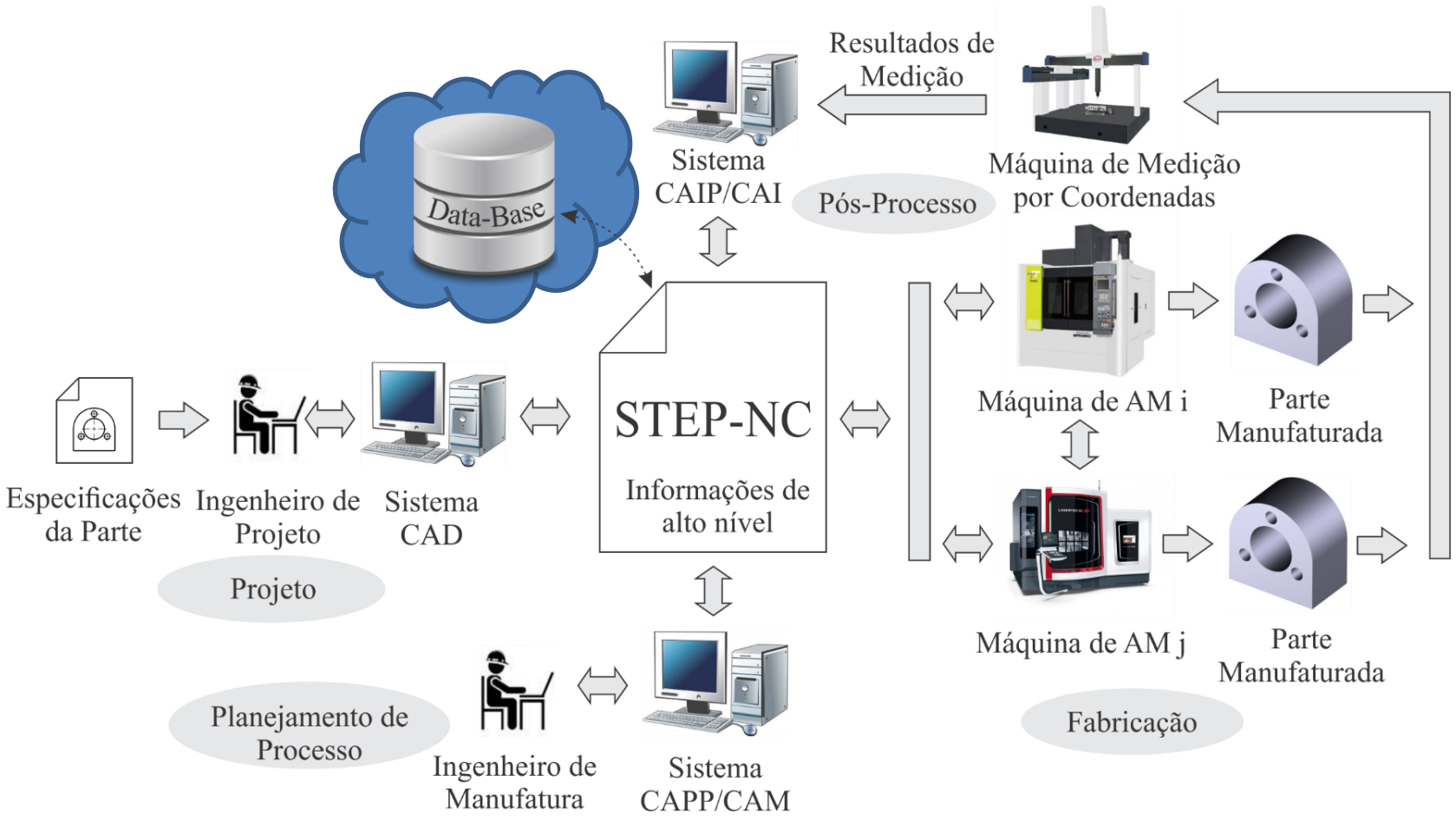
AM com camadas curvas



LaDPRER-GRACO-UnB

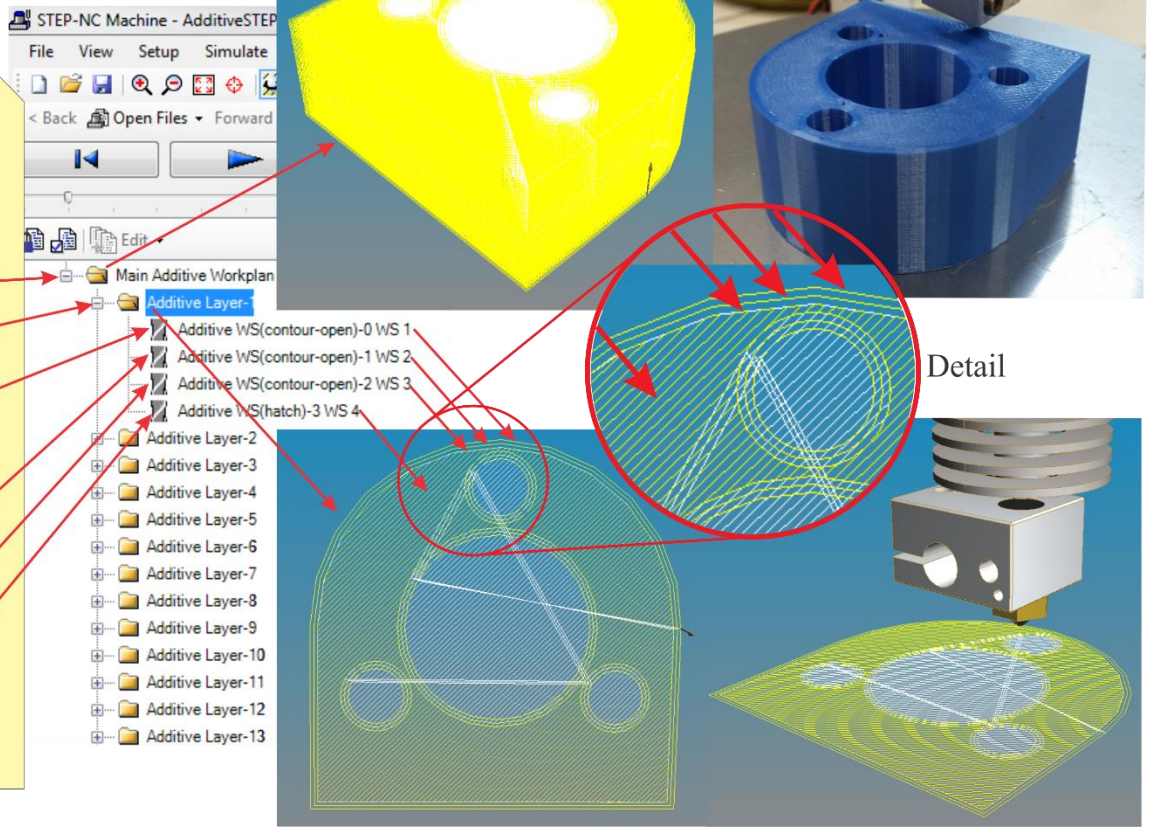


As novas possibilidades para AM com STEP-NC.

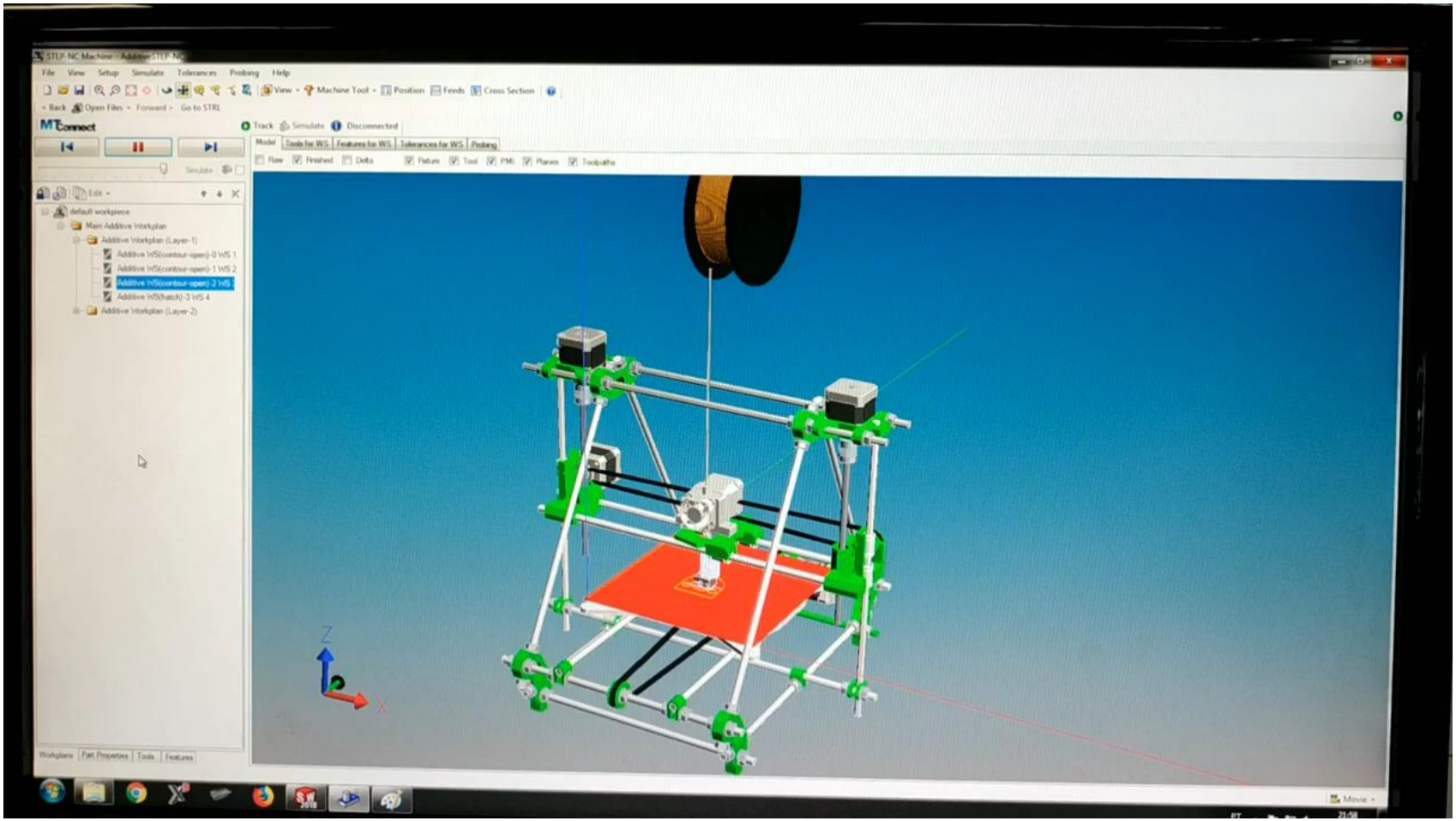


Avanços de AM com STEP-NC no LaDPRER.

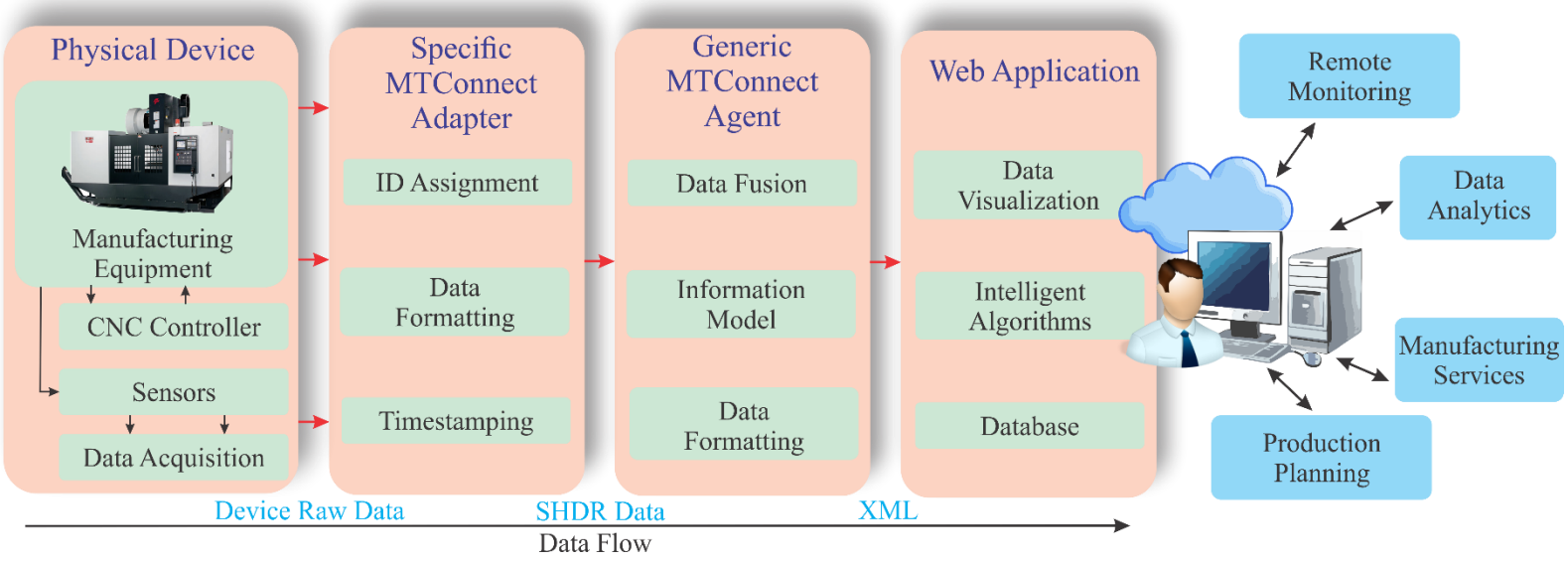
```
ISO-10303-21;
HEADER;
...
FILE_DESCRIPTION(
/* description */ ('ARM_SCHEMA: ap238_arm_schema'),
/* implementation_level */ '4;1');
...
FILE_SCHEMA (('INTEGRATED_CNC_SCHEMA'));
ENDSEC;
DATA;
* Application object: PROJECT (#10)
* ITS_ID: #10, #11, #12, ['Additive Manufacturing STEP-NC']
...
* Application object: WORKPLAN (#18)
* ITS_ID: #18, ['Main Additive Workplan']
...
* Application object: WORKPLAN (#65)
* ITS_ID: #65, ['Additive Workplan (Layer-1)']
...
* Application object: MACHINING_WORKINGSTEP (#70)
* ITS_ID: #70, ['Additive WS(contour-open)-0 WS 1']
...
* Application object: MILLING_TECHNOLOGY (#84)
#84=MACHINING_TECHNOLOGY('','additive',.,.);
...
* Application object: MACHINING_WORKINGSTEP (#1086)
* ITS_ID: #1086, ['Additive WS(contour-open)-1 WS 2']
...
 * Application object: MACHINING_WORKINGSTEP (#2824)
 * ITS_ID: #2824, ['Additive WS(contour-open)-2 WS 3']
...
* Application object: MACHINING_WORKINGSTEP (#6097)
* ITS_ID: #6097, ['Additive WS(hatch)-3 WS 4']
...
ENDSEC;
END-ISO-10303-21;
```

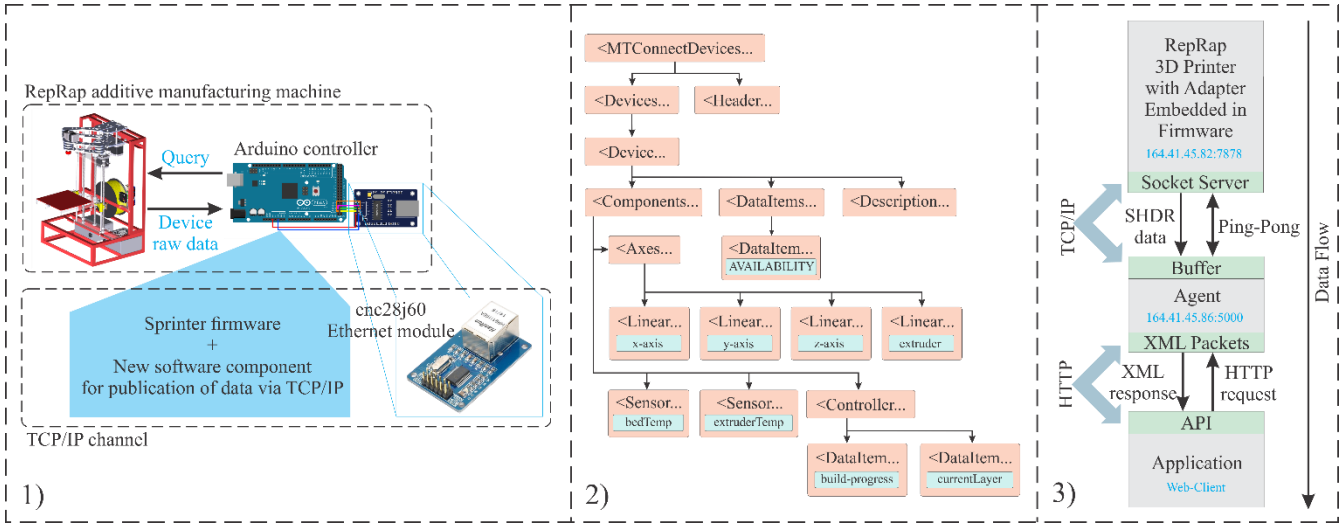


Avanços de AM com STEP-NC no LaDPRER.

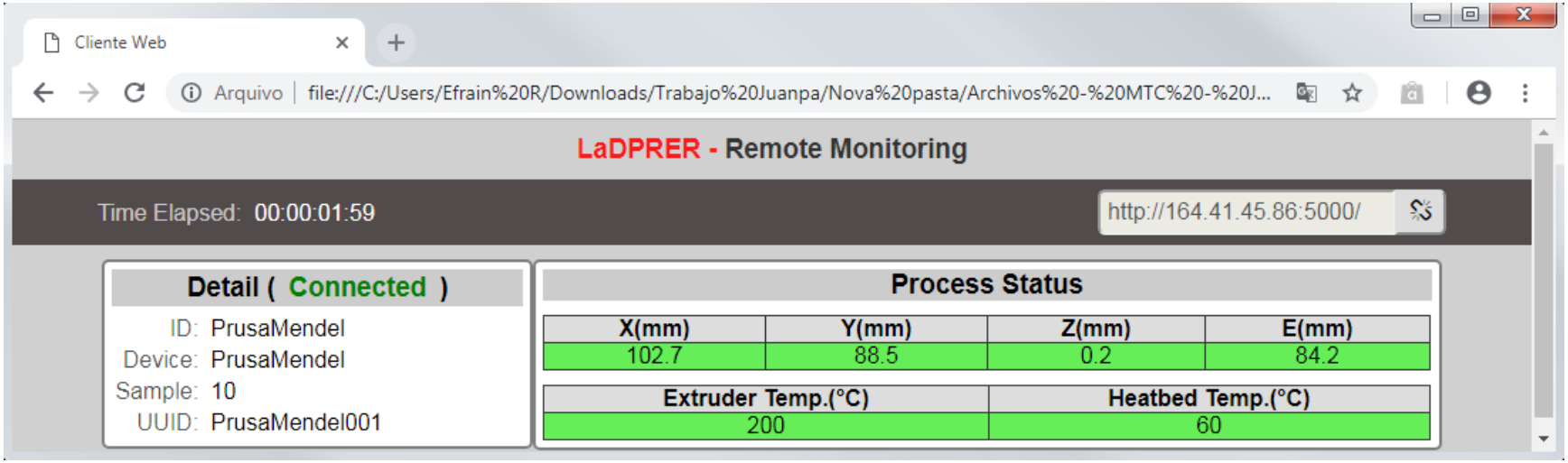


AM com MTConnect.

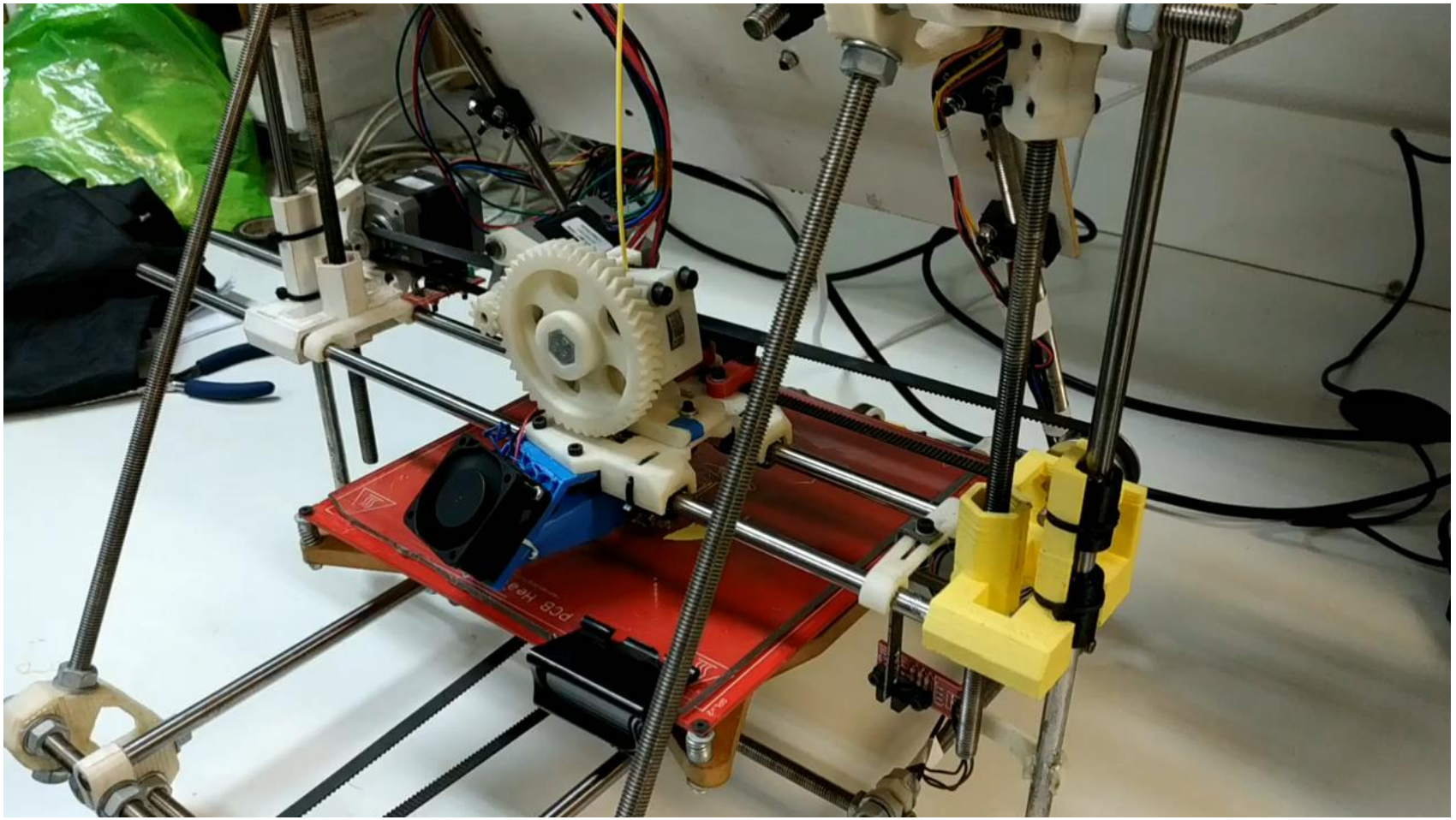




Um protótipo de cliente web com MTConnect.



Demo.



OBRIGADO!!!