

#### CdhW UbXH Yfa U GYbg]b[ Zcf 5XX]hj YA Ubi ZMi f]b[

5`VYfh7"HcžD\"8" K]``]Ua?Yd`Yf`K\]hYZcfXDfcZYggcf k]h`Wbhf]Vi hcbgʻZfca`G\Ukb<]bbYVi gWž6Yf\_Un6cgfUbž8Uj ]X`5bXYfgcbž5`U C``YU\_žLi Ub`@]Ub[žFUb`Nci fĐ79`8YdhHžDfcZ?Yj]b`7\Yb`fĐ79`8YdhHž 8YdUfha YbhcZA YWUb]W`9b[]bYYf]b[`UbX`A UMf]UgʻGVJYbW` I b]j Yfg]mcZD]HgVi f[\

> J]fhiUKcf\_g\cd`cb`Cdh]WGGbgcfgZcf`9bYf[m5dd`]Wh]cbg` AUW &z&&





#### 5 bgmg 5 XX]hjj Y A Ubi ZWhi f]b[ FYgYUfW @V f5 A F @L

#### **Optomec LENS 450**





Established in 2015

2,000 sq ft lab space

**GEFERTEC arc605** 

## 5 A 6 i ]`X': U]`i fYg

#### 9CG'A & \$'8 A @G















## 9ZJVJYbhFYg]XiU`GhfYgg`AcXY`]b[



## H\Yfa U'AcXY'7U]VfUhjcb



## GYbgcf!: i gYX<sup>5</sup> A <sup>D</sup>fcWygg

11

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#### Ugpuqt 'Hwugf 'CO 'Rt qeguu

- الله الله 't guqnwhqp't gcn/vho g'V'( 'Ù '' o gcuwt go gpvu
  - "F guli p'r t qr gt 'lwt wevwt gu'vq'go dgf" ugpuqt u'y ky qwv'f kuwt dkpi 'CO" r t qeguu'cpf 'r ct v'kugm"
  - 'Tgcn/vko g'o gcuwt go gpw/iq'iwwf {" CO'i t qeguu'lwugh'
  - "Rquv/rtqeguu'o qpkvqtkpi 'vq'ivwf{" tgukf worliwtokp'hqtoovkqp'opf" tgnozovkqp0

'Eqorctg.'eqttgev.'cpf 'xcnlf cvg'FV

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#### GYbgcf!: i gYX<sup>5</sup> A <sup>D</sup>fcWygg



### 8 YZYWg']b'@JgYf'Dck XYf'6 YX'5 A





5 BGMG 588 + H⇒J9 A 5 BI: 57 HIF + B;Á F9G95 F7< ® 6 C F5 HC FM

100 µ

#### =b!G]hi '8 YZYWhi8 YhYWhjcb'l g]b[ '= F'=a U[ ]b[ 'UbX'A @





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°° °C'h7' °⊄R' °C'h7'

### =b!G]hi '∓ '7 Ua YfU

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- Î I €¢I Ì €ÁÚã¢^|Áå^c^&d[¦ ″Á HÎ €Áµ{ Ájã¢^|Á;ã^
- Øłæ{ ^ÁÜæe^kÁ+€ÁÇØÚÙD
- Üæ) \* ^• K ″Á ËG€Á ÁFG€ÁÔ **″ \$ Ë\* ) \$ š7** ″Á H€€Á ÁGÊ€€€ÁÔ









### =b!G]hi <sup>-</sup>=FÁ G][bUhifYÁ 9IhfUWF]cb

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# 7 ca d`Yl DUfh'< YUhA Ud



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5 BGMG 588 + H⇒J9 A 5 BI: 57 HIF + B;Á F9G95 F7< ® 66 CF5 HCFM

#### 7 ca d`YI DUfh =bhYfdUgg HYa dYfUh fY





ENGINEERING





Temperature



CoolingRate

Spatter



In-Situ IR Signatures

# Dcfcg]mi5bUmg]g





5 BGWG 5 8 8 = 1= 3 9 A 5 BI: 5 / HIF = B; / F9G95 F7< © 56 CF5 HCFM

## 8 BBg<sup>·</sup>Dcfcg]m<sup>·</sup>DfYX]W<sup>·</sup>]cb



DfYX]Wi]cb'UWW fUWncjYf'-\$i 'Zcf'dcfcg]micjYf'\$", i 'fr)\$'±aŁ

ANSYS ADDITIVE MANUFACTURING RESEARCH LABORATORY

#### : YUhi fY =a dcfHJbWY 5 bƯ mg]g VmG< 5 DÁ fG<Ud`Ym5 XX]hjj Y YI D`UbUhjcbgŁA Yh\cX







: cf a cfY`XYHJ]`g. @d • H33%.@ã d ] @ È ã@ à Èa Ea o\;] \^ cæà |^ Ë |Ëa [[\ 19 @d È@a |

ANSYS ADDITIVE MANUFACTURING RESEARCH LABORATORY

#### =bjYfgY7cffYUh]cb'VYhkYYb'GdUhh¥fÁ 7cibhg'UbX'Dcfcg]hm





#### K\Uh5Vcihh\Y7cc`]b['FUhYUbXÁ <YUhaUd3





″Á

# 7 cbWi g]cbg

- ″ÁU] cã&æ‡Áãa^¦Ár`, &&^● ~`∥^ Á<u>^{à^åå^åÁ ●ã \*ÁŒ</u> Áœ}åÁå^-{| ¦{æaãa}}Á {^æ•`¦^{ ^} okçæ‡ãåæe^å
- ″ÁXæłąĨ`•Á<u>^^Á;ãt}æč¦^•</u>Á&æ}Á\sæ}Á\skachák¢d;æ&c^åÁ\[{Á蛇Á;ãj\*|^ÁѾÁ&æ{^}æÁ -{¦Á\sh^c^&<del>c3j\*/私^^&©</del>
- <u>: i hi fY'K cf</u>



# H\Ub\_'Mci°

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"Áœţà^!cŒ O] ãcĒ\*å"
"ÁÖ^] æbq{ ^} cĂ Ă
T ^&@æţ æbæţÂQ} \* ā ^^¦ā \* Á
BÁT æe^¦ãæţÂQ&â`} &^
"ÁW} ãç^¦•ãc Á ÁJãc•à` ¦\* @



