

# General Atomics Inertial Fusion Technology (IFT)

## Partners in the Target Fabrication Community

FI



LANL



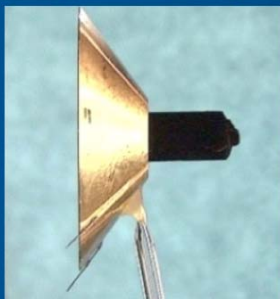
LLE



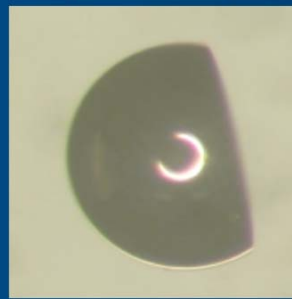
LLNL



NLUF



SNL

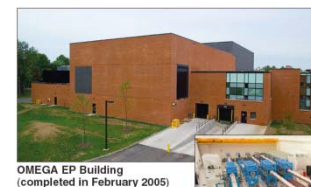
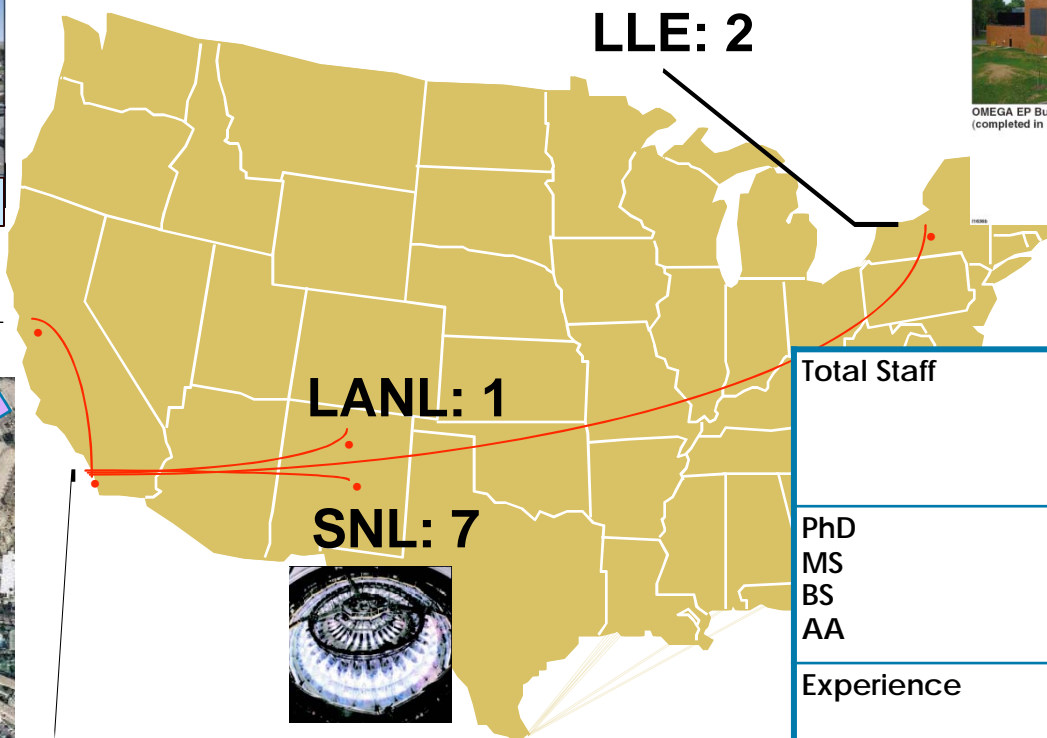
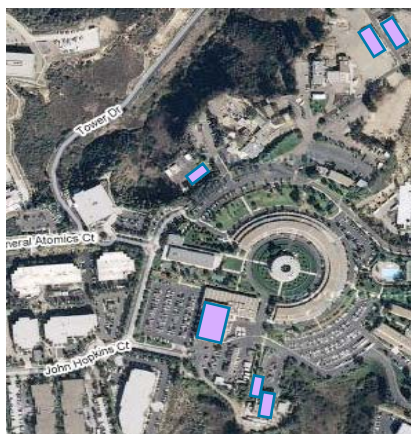


Presentation by Brian Vermillion  
OLUG  
LLE, Rochester, 4/30/09

# General Atomics IFT has an experienced ICF target fabrication team



LLNL: 10

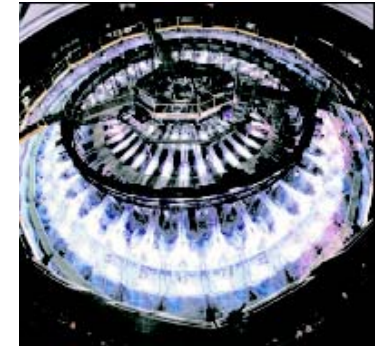


Total Staff	100 GA and subs 22 Students/Interns 3 Consultants 10 collaborators
PhD	22
MS	10
BS	27
AA	27
Experience	~ 900 person-years
Invited presentations	7 (2007-08)
Peer-reviewed publications	231 since 2000

GA staff are both in San Diego and onsite at various facilities

# GA produces targets for all the major NNSA ICF facilities

- Three major new ICF facilities

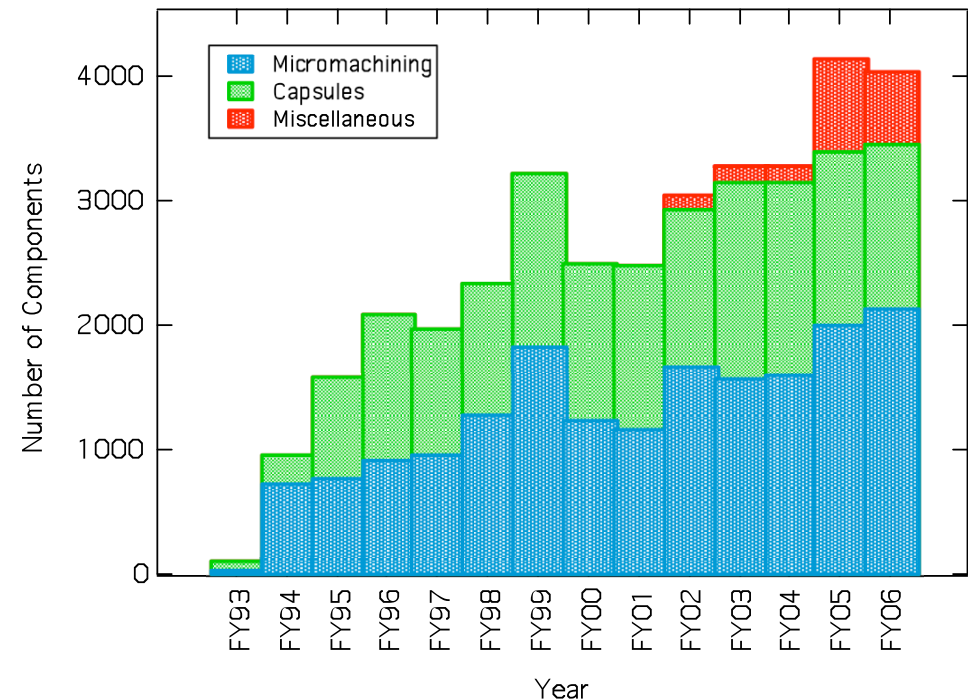


- The facilities use thousands of high precision targets/year
  - OMEGA ~ 4000 targets/year
  - ZR ~ 200 targets/year
  - NIF ~ many hundreds targets/year, starting 2009

**GA has over 19 years of ICF target fabrication experience**

# GA annually produces thousands of components for OMEGA under a stringent Quality Management System

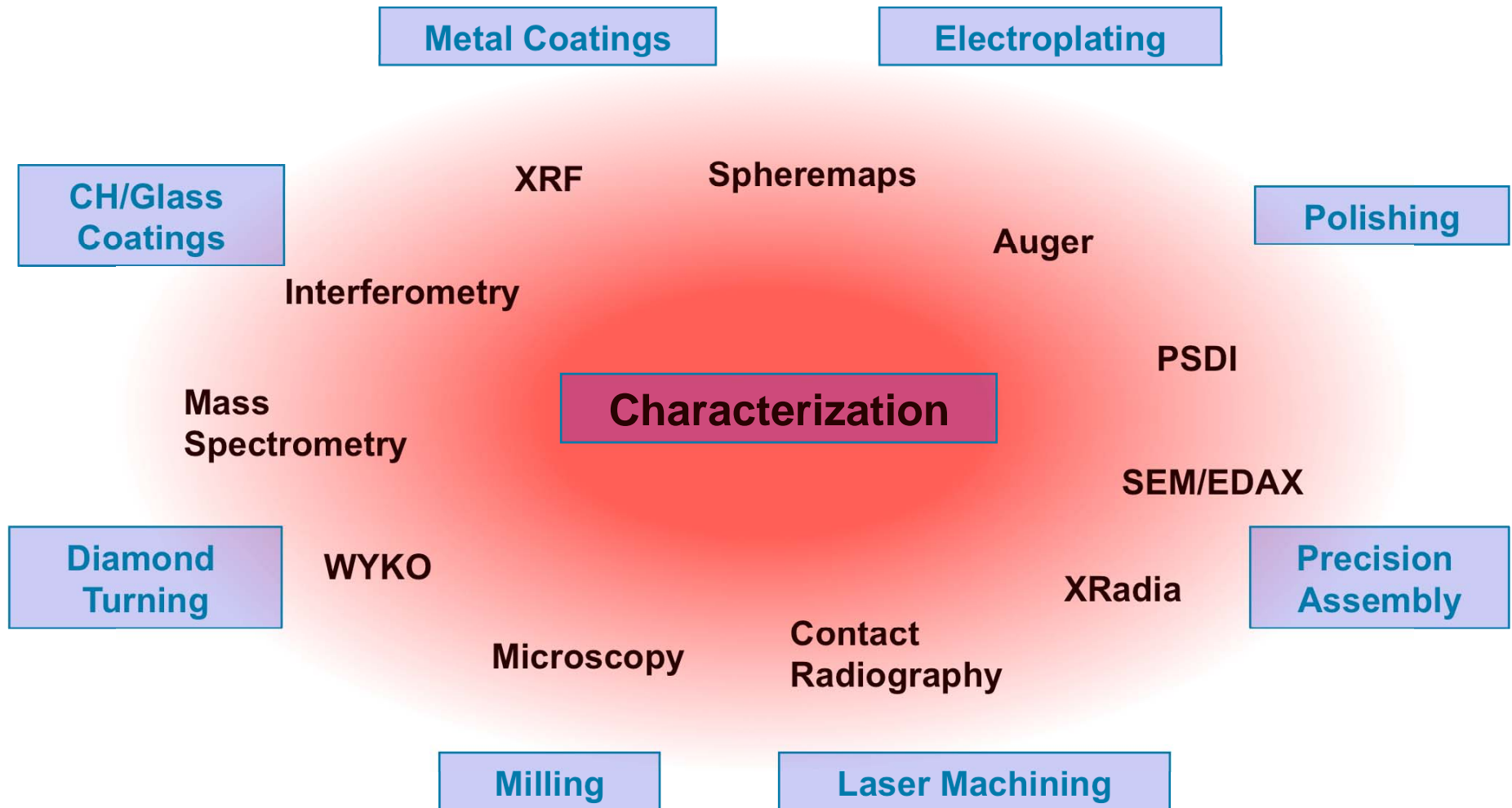
- Reliable fabrication of 4,000 components/year for ~70 categories
- ISO 9001:2000 sets a management structure
  - Customer interactions
  - Change controls
  - Documented work procedures
  - Regular internal/external audits
  - Quality Control
  - Staff training and publications
  - Quality Assurance
  - Management Review



**Continual Improvement is a Key Objective**

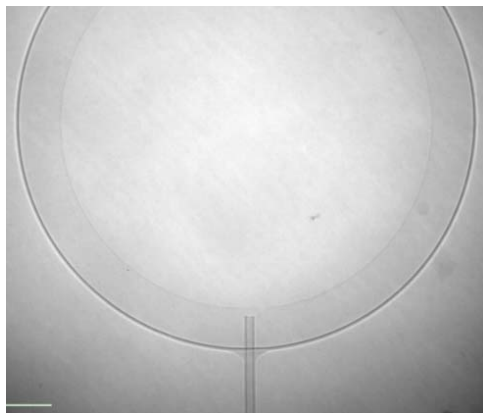


# Commonality of technologies at one facility improves fabrication efficiency and reduces duplication of resources



# GA produces many target components for OMEGA

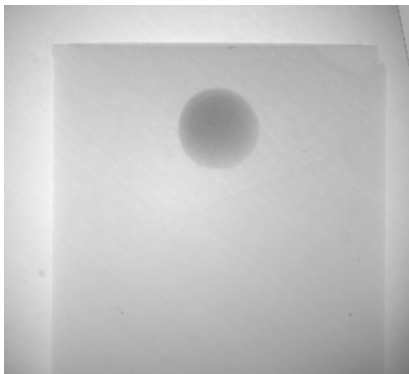
**Foam capsules with  
fill tube for FoamImp**



**Capsule and cone  
for Fast Ignition**



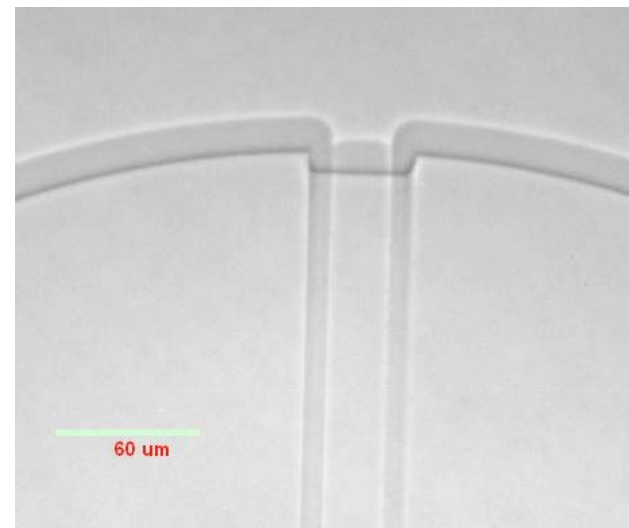
**Embedded features  
for Astroshock**



**Double Shell for  
DynHohl**



**Inner trenched capsule for  
DImE**

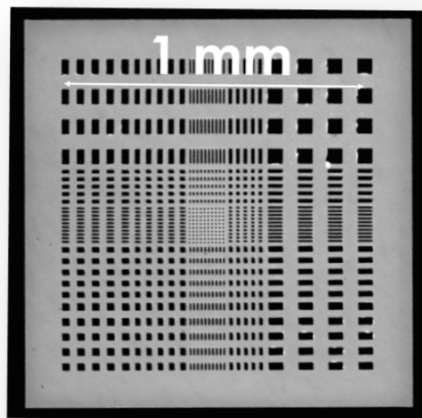


# GA produces many target components for OMEGA

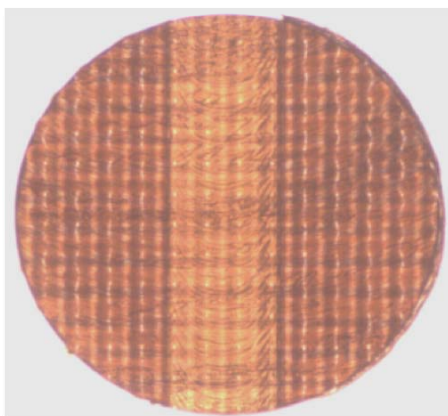
**NIF Direct Drive  
Fill Tube Target**



**Laser Machined  
Calibration Grid for  
20keV BL**



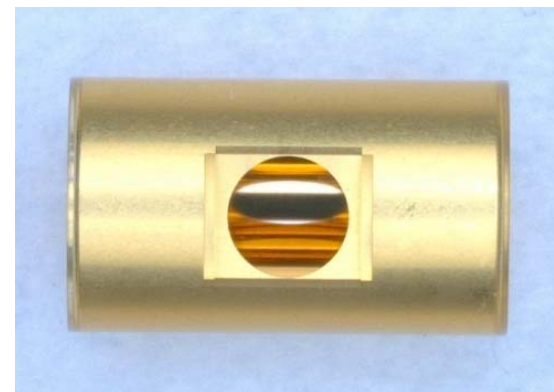
**Machined  
perturbations for  
Supernova RT**



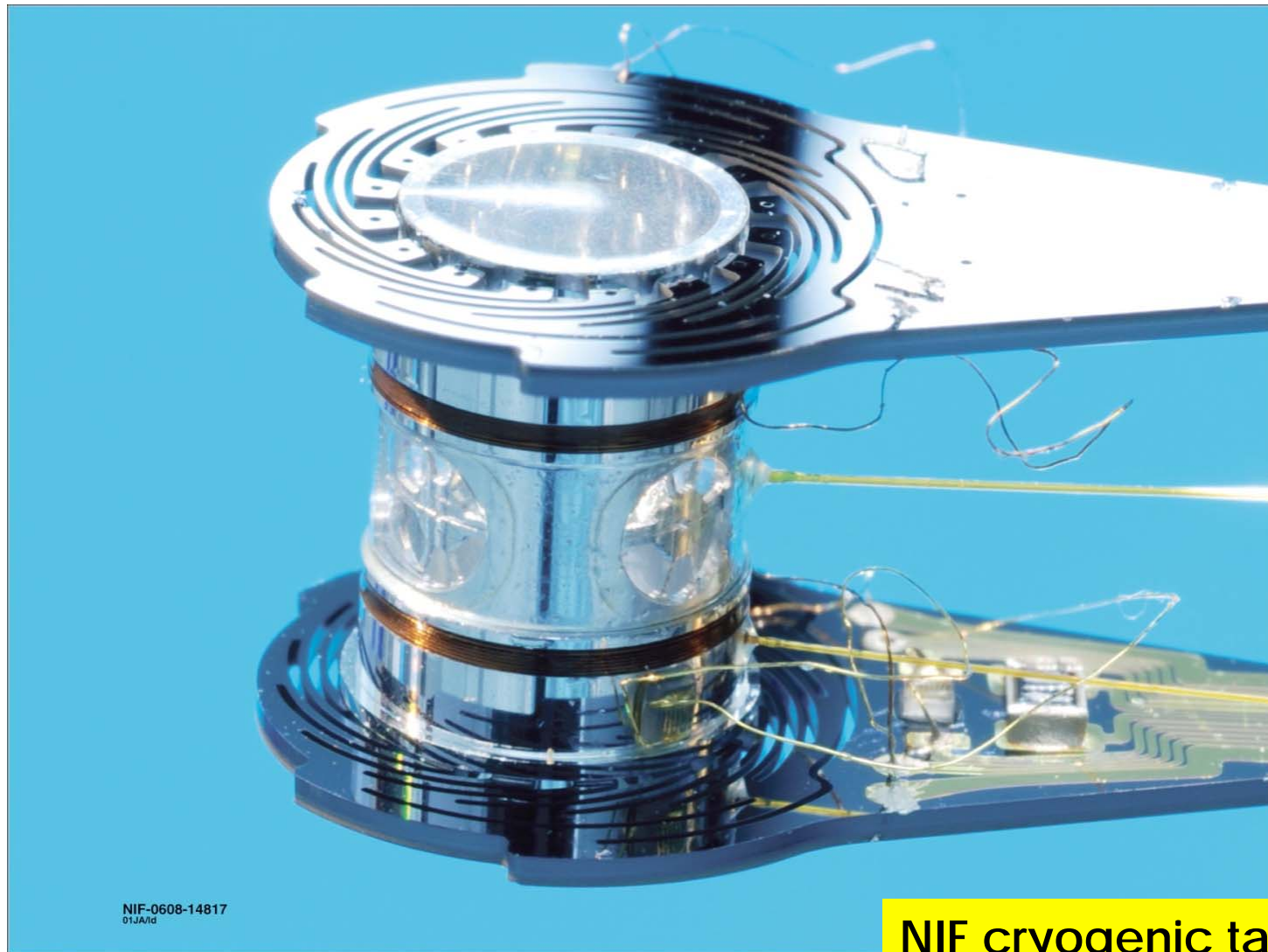
**Cryo shell for NIC**



**1 micron thick Au  
hohlraum for ICE**



GA makes many of the NIF ignition target components and is a partner in the National Ignition Campaign



NIF cryogenic target



# OMEGA target request process starts with the target request form: TRF

**General Atomics Target Request Form**

**General** Assembly Final Data Lab Coordinator Plan Summary Feedback Help

Go To Order # 296 Version: Original ▾

ShotDate: 05/06/2009

Experiment Shot Name: DiagDev-CIS-09A

[Help with this form](#)

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\*Experiment Shot Name DiagDev-CIS-09A

\*Experiment Series Fast Ignition ▾

\*Sub-Program NIC-Dev ▾

\*Program NIC-DDI ▾

\*Requesting Laboratory LLE ▾

\*Coordinator Bonino, Mark ▾

\*Shot Facility Omega ▾

\*Shot Date 05/06/2009

Total Number Shots 5

\*PI Name Phone # E-Mail

Theobald, Wolfgang ▾	585-273-2628	wthe@lle.rochester.edu
Stoeckl, Christian ▾	585-273-2633	csto@lle.rochester.edu

Fully Assembled Target ID

\*Brief Target or Component Description Cu Cone & Shell, old name is Int-FI-09D

Note: Fields marked with \* are searchable.

Attached Documents

	Format	Drawing Number	Description
<input type="button" value="Edit"/>	PPT	NA	

# OMEGA target request process starts with the target request form: TRF

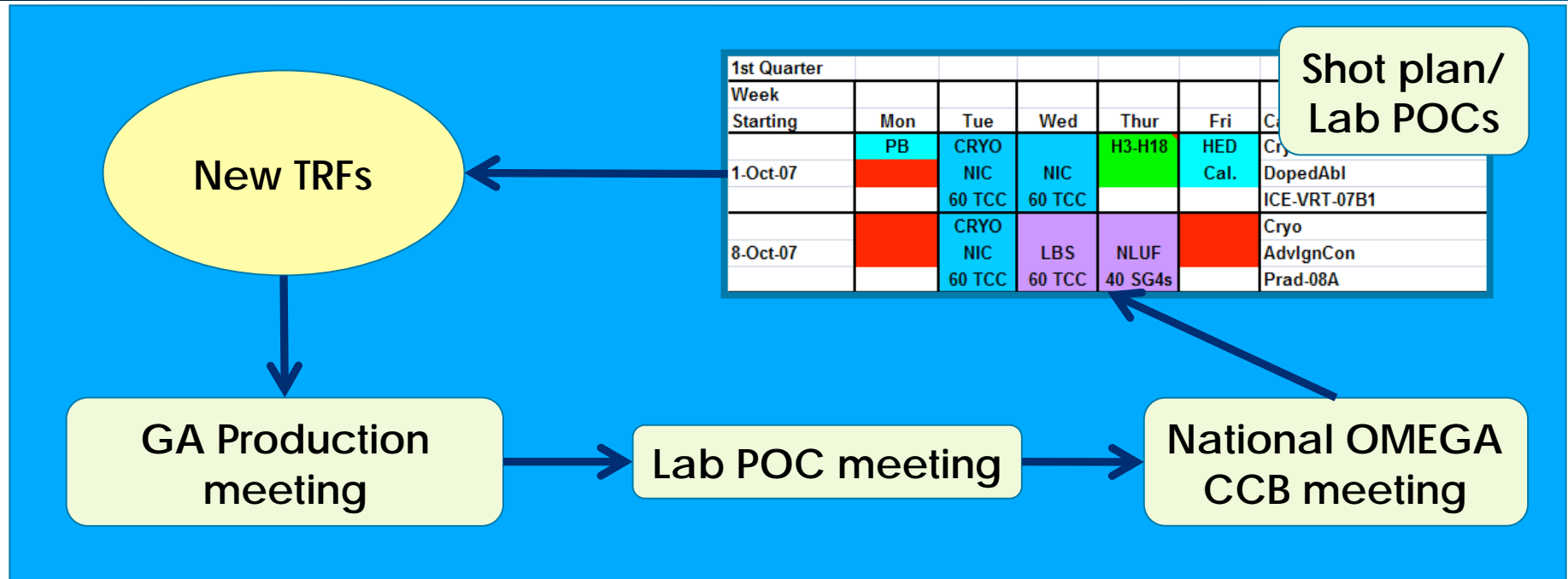
Component Type	<input type="text"/>	Fab. Center	<input type="text"/>	Best Effort	<input type="text"/>
Order	<input checked="" type="radio"/> GA <input type="radio"/> Non-GA	<input type="text"/>	<input type="text"/>	None	<input type="text"/>
General Descriptor	<input type="text"/>	WONO	<input type="text"/>		
Primary Descriptor	<input type="text"/>	GA Order	<input type="text"/>		
Usage	<input checked="" type="radio"/> External <input type="radio"/> Internal	Customer #	<input type="text"/>		
<input type="button" value="Edit/Add"/> <input type="button" value="Remove"/> <input type="button" value="Clear Edit Area"/>					

☒ Check here if any component requires assembly

	GA	Fab Center	Component Type	General Descriptor	Primary Descriptor	Group	Secondary Descriptor	Due date	Qty.	Usage	Best Effort	WONO	GA Order	Cust. #		
<input type="button" value="Edit"/>	GA	IDC	Capsule	CH	CHsingle	A	40 micron SCD to CPM, 2 racks of 12	03/06/2009	24	Internal	None	C30272-9570	IDC-LLE-296-Int-FI-09D Rev 0		<a href="#">Order Specs</a>	<a href="#">Status</a>
<input type="button" value="Edit"/>	GA	IDC	Capsule	CH	CHsingle	A	40 micron SCD for TCC and neutronics reference	04/06/2009	7	External	None	C30272-9570	IDC-LLE-296-Int-FI-09D Rev 0		<a href="#">Order Specs</a>	<a href="#">Status</a>
<input type="button" value="Edit"/>	GA	CPM	Micromachining	Cone/Shield	Cone	A B C	20 mic thick Cu Cone 25 mic thick Cu Cone 30 mic thick Cu Cone	04/13/2009 04/13/2009 04/13/2009	5 5 5	External	None	C30272.9490	COM-Int-FI-09D Cone & Shell	Int-FI-09D	<a href="#">Order Specs</a>	<a href="#">Status</a>
<input type="button" value="Edit"/>	GA	DDC	Capsule	Cryo	SCD	A	CD shells	04/16/2009	6	External	None	C30272 3020	DDC 296 DiagDev-CIS-09A		<a href="#">Order Specs</a>	<a href="#">Status</a>

2008 Laboratory for Laser Energetics

# High level scheduling completed in close partnership with laboratory POCs, TFEs, and Pls



## OMEGA change control board process

- Discuss all OMEGA targets:
  - Track status
  - Flag and resolve issues
  - Planning

# Sample of component variety shipped Q1-FY09



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[http://fusion.gat.com/ift/ICF\\_Catalog/index.html](http://fusion.gat.com/ift/ICF_Catalog/index.html)

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