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# NIF Working Plan

T. Land

May 16, 2013

ILOW

Livermore, CA, United States

May 14, 2013 through May 16, 2013

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# NIF

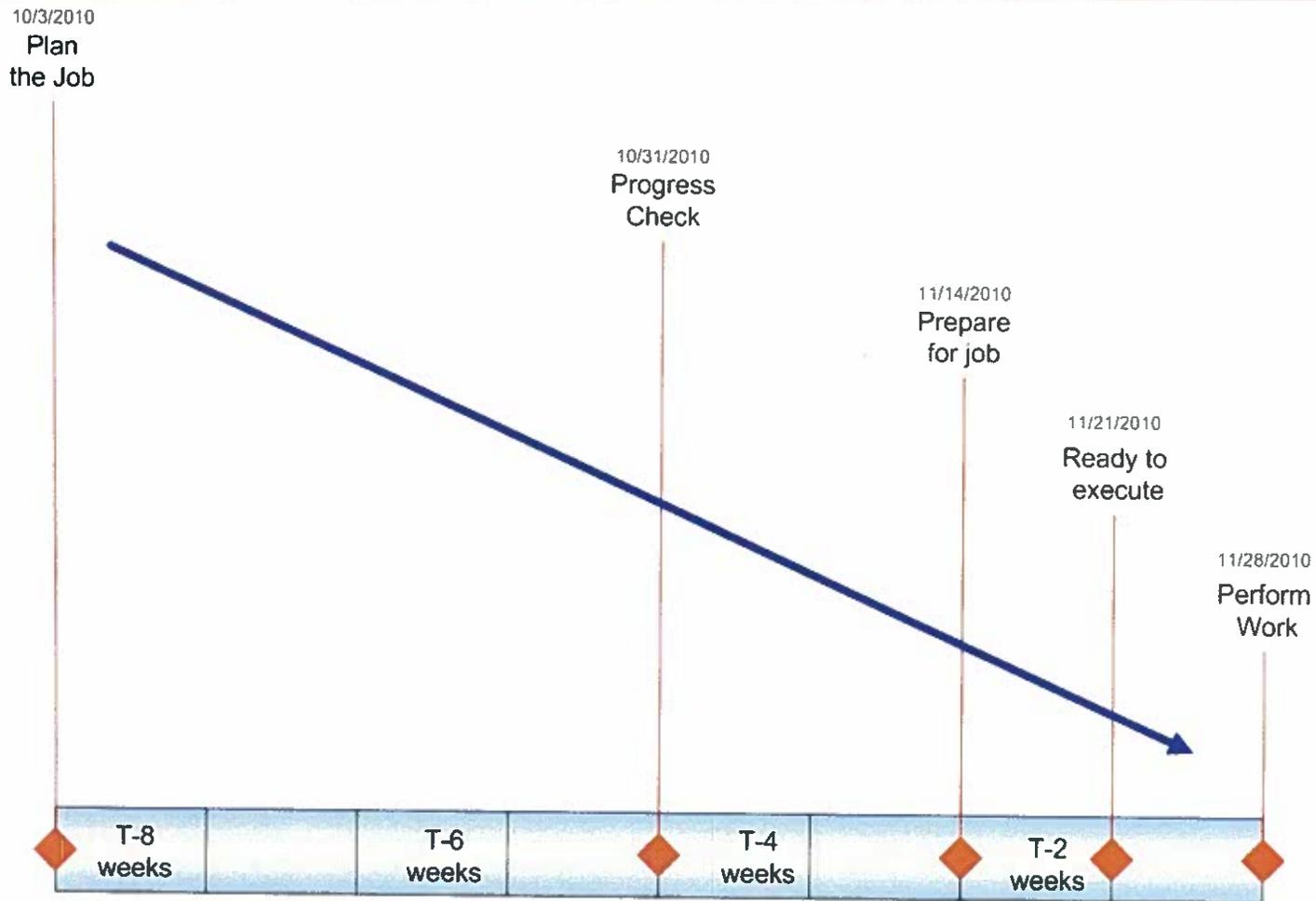
## NIF Working Plan

**Presentation to  
International Laser Operations Workshop (ILOW)**

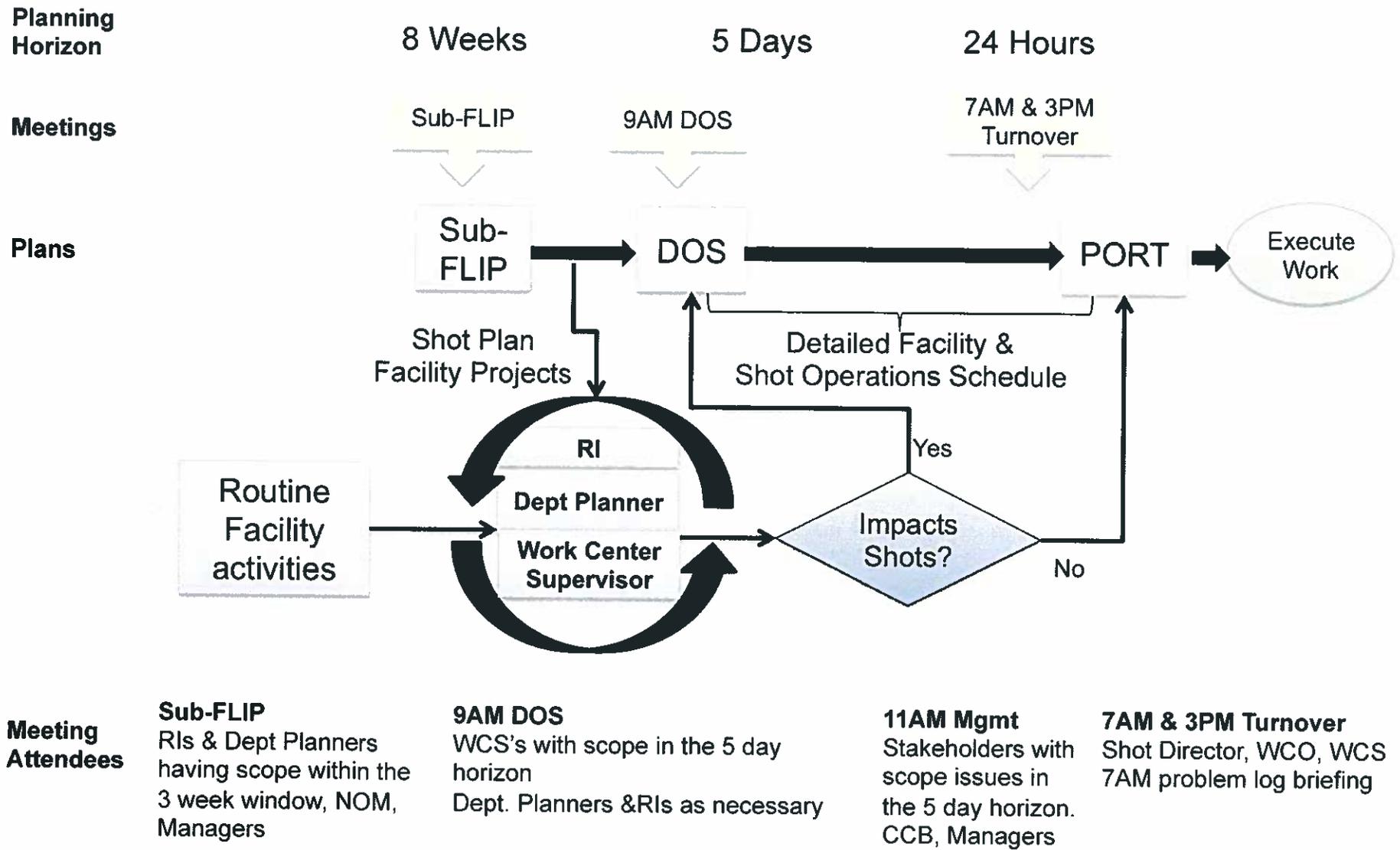
**Terry Land  
May 14, 2013**



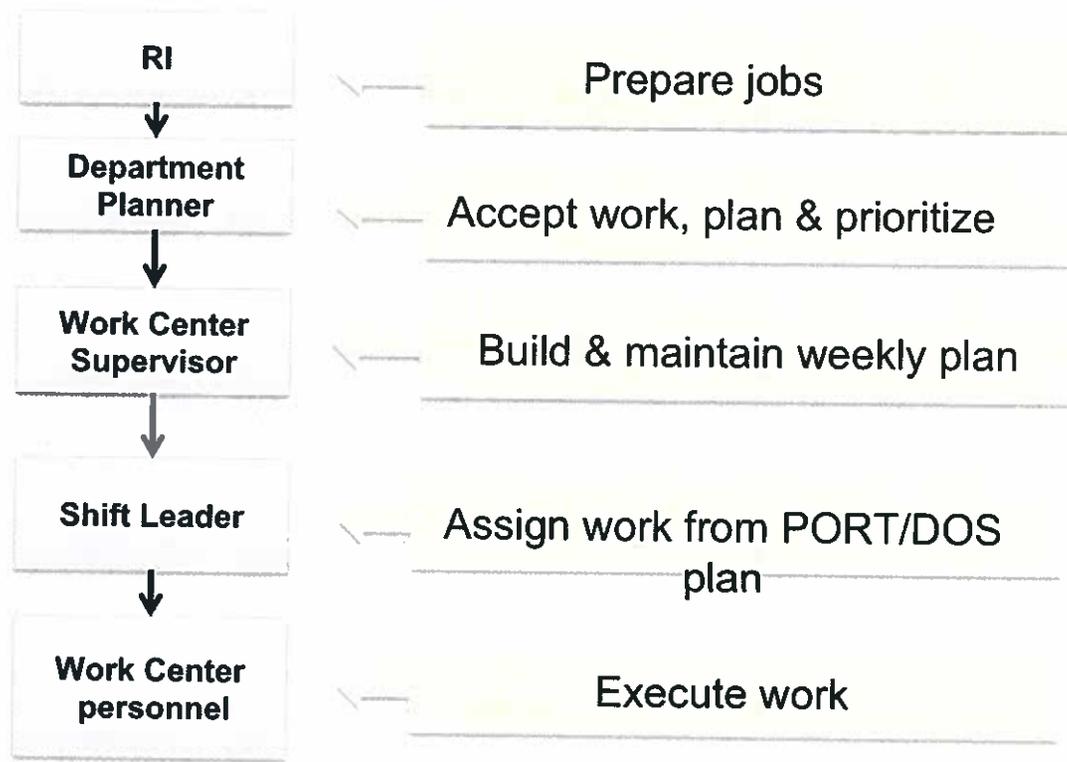
# Goal is to “glide” work into Work Centers using T-8 planning or planning checklist



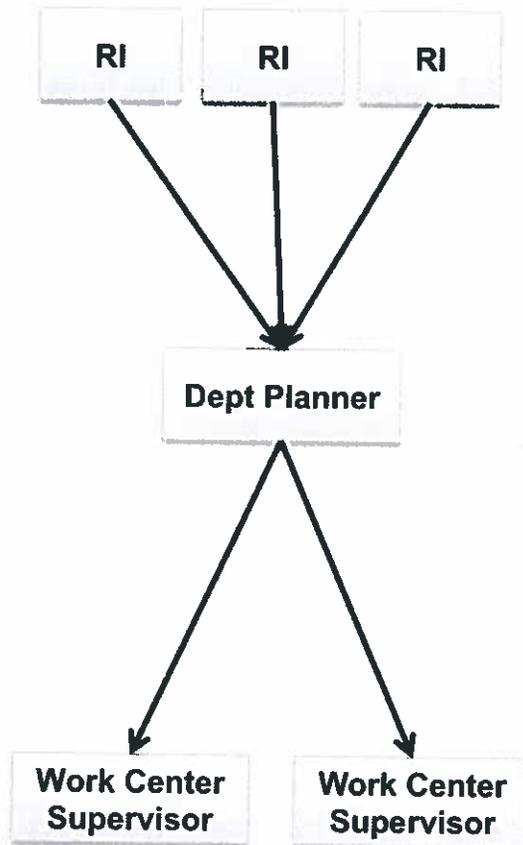
# Planning process and supporting structure



## Individual Work Center Planning, Scheduling & Execution Structure



## Planning process roles and responsibilities



- Ultimately responsible for job
- Detailed planning and readiness of job
- Safety, Quality, Execution of work

- Facilitates planning and ensures work is represented in the Sub-Flip/DOS schedules as required
- Ensures that RI jobs are well planned and ready to execute
- Knowledgeable of the impacts of work on the facility
- Work with Managers/RIs to prioritize work

- Works with Dept Planner to understand work scope and priorities
- Resource load plans



# NIF Departments and Work Centers

| Area            | Manager                | Departments  | Department Planner     | Work Center Supervisor     | Work Center |
|-----------------|------------------------|--|------------------------|----------------------------|-------------|
| Laser           | S. Burkhart            | BCS, BCTA, Wavefront, OI,FODI  | M. Witte               | D. Smauley                 | BCSAO       |
|                 |                        | Pulse Power Operations   | P. Arnold              | B. Le Galloudec            | PPOPs       |
|                 |                        | Pulse Power Engineering  | P. Arnold              | B. McHale                  | PPENG       |
|                 |                        | PAM, PABTS,MOR,LD  | L. Smith               | L. Smith                   | ILS         |
| FOM             | B. Merritt             | Laser Diagnostics (DRD/RCAL)   | S. Cohen               | C. Carr                    | TAO         |
|                 |                        | 1w Beampath & LRU Installation   | S. Sommer              | E. Downing                 | T&H         |
|                 |                        | 3W Beampath & LRU Installation   | S. Sommer              | C. Carr                    | TAO         |
|                 |                        | FOM Process Utilities  | S. Sommer              | M. Cohen                   | FOM         |
| Cryo Operations | T. Kohut               | FOM Conventional Facilities  | N. Jize                | M. Cohen                   | FOM         |
|                 |                        | Cryo Operations, target exchanges, vessel maintenance and engineering upgrades   | T. Kohut               | P. Amick                   | CTS         |
| Engineering     | G. Deis                | Alignment Systems including TAS, CCRS, OPAS, CIVS                                | J. Cox                 | J. Nally                   | TDE         |
|                 | J. Celeste, G. Krauter | Manipulator Based Diagnostic Systems (MBDS)                                      | J. Cox                 | C. Carr                    | TAO         |
|                 | R. Zacharias, B. Palma | Fixed Diagnostics Systems (FDS) incl NBI, FABS, VISAR xTiming & Fiducial Systems | J. Cox                 | J. Nally                   | TDE         |
|                 | P. Bell                | Target Diagnostic Software   | R. Shelton             |                            |             |
|                 | J. Bell                | SIS/ICS  | J. Bell                | J. Bell                    | HS SW       |
|                 | G. Brunton             | Integrated Controls  | S. Townsend            | J. Keating<br>D. Lancaster | ICCS        |
|                 | A. Casey               | Data Systems   | S. Townsend            | J. Keating<br>D. Lancaster | DS          |
|                 | B. Demaret             | Controls Hardware  | C. Powell<br>B. Beeman | C. Powell<br>B. Beeman     | INC         |
| Mission Support | T. Frazier             | Information Systems  | M. Christensen         | M. Christensen             | IS          |
| SHO             | M. Newton              | Shot Operations  | B. Burr                | A. Langro                  | SHO         |
| CM              | J. Schindler           | Construction Management  | I. Chang               | I. Chang                   | CM          |

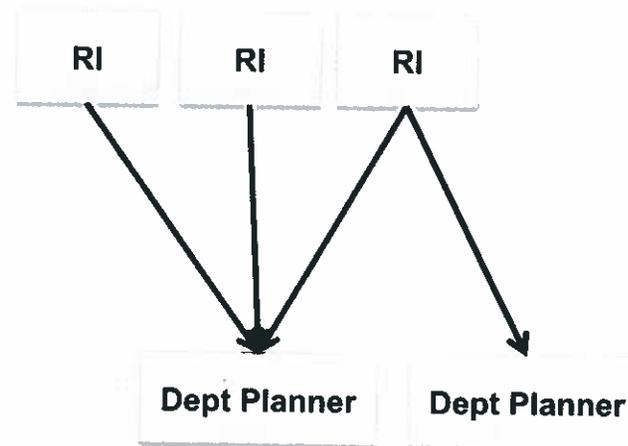
# Work Centers

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- A work center is defined as a group of people assigned to perform specific work activities
    - By functional area such as Facility Operations & Maintenance, Target Area Operations, Transport & Handling, Injection Laser Systems, etc...
  - Or
  - Can be defined by skill or craft, such as electricians, pipefitters, riggers, mechanical technicians, etc...
- 
- By defining work centers activities can be assigned and loads can be leveled
    - Understanding work loads early enables discussions about moving work scope in and out of a maintenance period based on manpower or moving resources to accommodate work in different work centers
    - Management gains a better understanding work center loads prior to entering maintenance periods

## Responsible Individual (i.e. SM, Engineer) responsibilities

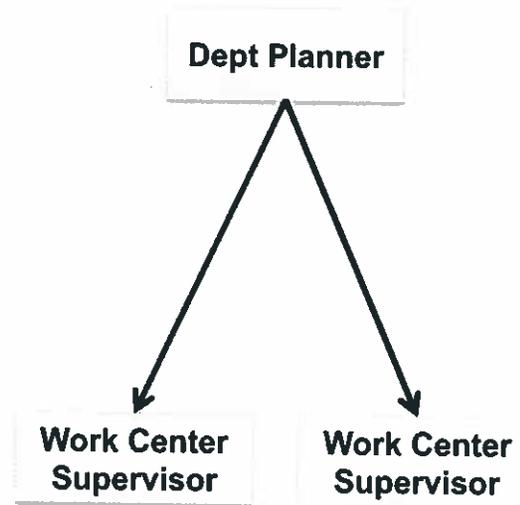
- Ultimately responsible for job:
  - Detailed planning and readiness of job
    - For larger jobs/projects or new work follow the T-8 glide slope planning process/checklist to reach T-1 state
  - Safety and Quality of work
  - Execution and completion of work
- Identifying facility conditions required to perform work, and impact of the work on the facility
- Working with Dept. Planner to reflect job in integrated schedule



## Department Planner responsibilities

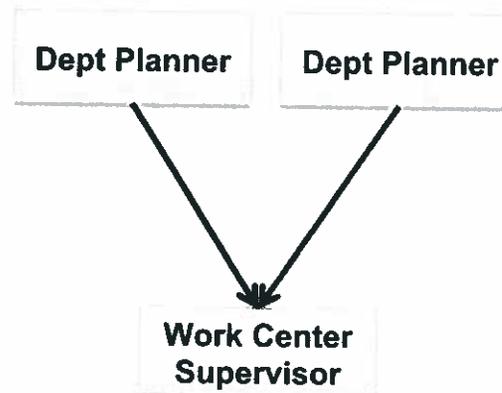
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- Facilitates the RIs in planning and getting jobs done on schedule
  - Integrates jobs with routine work and shots
  - Reviews job readiness
- Work with Managers/RIs to prioritize work
- Work with RIs to ensure that work is represented in the Sub-Flip or DOS schedules as required
- Work with Work Center Supervisor to prioritize, schedule & resource load jobs



## Work Center Supervisor (WCS) responsibilities:

- Work with Dept Planner to understand work scope and priorities
- Resource load plans
  - Staff jobs - assign DWTL's and qualified workers
  - Tracks execution of work
- Attend required meetings to integrate jobs into the facility daily work plans (DOS/PORT)
- Work with other WCS's to share manpower when needed
- May perform the following additional tasks:
  - Ensure that team has complete work packages, including permits, reviewed work scope, hazards and controls
  - Tracks training and qualifications of people in work team



# Plan the job at T-8

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## Department planner works with RI/SM/Engineer to define:

- Scope of work
  - ID facility impact
  - ID Facility configuration needed for this job: key trees, chamber vent, Argon vent....
  - ID re-test requirements
- Review & walk design with Eng, SM, CM if required
- Is WAP required?
- ID parts, material list, tools, special equipment needed
  - Confirm availability
  - ID fit test plans
- ID any procedures, special permits (H&R, RWP etc...) and drawings required
- ID work hazards or other special; CZ, rad, confined space, energized equipment
- Manpower strategy with Work Center Supervisors (RCTs too)
  - Estimate of how long (# shifts) and how many people
  - Special qualifications and training
- Plan in SubFLIP and SMaRT (get commitment from Sr. Management for Facility Configuration)
  - ID activities to be tracked
- Once the baseline plan is approved for a maintenance period only jobs that are approved by the SubFLIP CCB will added

## Progress Check at T-4

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### **RI/SM/Engineer evaluate progress with Dept Planner:**

- **Confirm on track for readiness:**
  - Parts – material list complete and shortage report available
  - Fit test, measure, compare to old, etc...
  - Special Tools & equipment –list complete and listed in work order
- **ID work team with Work Center Supervisor**
- **Review/walk down procedures**
  - Include technicians that will perform work if possible
  - Early familiarization and feedback
  - critical for new, complex or infrequently performed
- **Procedure/checklist released in ECMS**
- **Special training outside of Q-cards planned**
- **Track status of other potential problems**
  - Hoisting & Rigging permits released by ERC
  - RWPs requested
  - Scaffold needs identified and communicated with Scaffold Coordinator
- **SMaRT work order approved**
- **Write 1<sup>st</sup> version of the Work Permit (may be used as an aid to RWP development)**
- **Scope freeze for FM&R: to add work must go through CCB**

# Prepare for job at T-2

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## **RI/SM/Engineer work with the Work Center Supervisor to:**

- Review all permits
  - Work permit ready to release
    - Well defined scope
    - LOTO, controls and re-test sections complete
    - Post job activities and material disposition (need RMA storage, tools returned to tool crib, etc...)
  - Other special permits ready and approved for use
- SMaRT work order released
- Conduct pre-job walk with Work Center Supervisor or Field Supervisors
  - Go to job site and evaluate what needs to be done to start work
- Confirm with IWS RI that special qualifications and training are complete
- Parts
  - Run shortage report with OSB warehouse and confirm kitting strategy is ready
- Re-confirm work coordination interfaces
  - Scaffolding
  - Rigging
  - RCTs
  - Facility Conditions

## Ready to Execute at T-1

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### **Work Center Supervisor will verify:**

- Work permit released and all other permits approved and ready for use
- Kick off meeting is scheduled
  - Review Rad work permit
  - Review Procedure released in ECMS
  - Review work order
  - Review EIPs
- Parts delivered and kitted in OSB
- Special tools and Equipment kitted and in OSB
- Re-confirm work coordination interfaces
  - Scaffolding
  - Rigging
  - RCTs
  - Facility Conditions
- Work does not get on schedule unless T-1 task completed

## FLIP weekly meeting

**Purpose:** Develop and maintain integrated shot and supporting facility configuration plan integrating diagnostics, major upgrades, optics use and configurations (e.g CPPs), classified capability.

**Planning Horizon:** 2-6 months shot and facility configuration planning

**Product:**

- FLIP Plan - 2-6 month approved shot sequence stored on FLIP folder **xxxxx**, approved facility configuration for a minimum of 2 months
- FLIP lane in SPLAT serving as the basis for the proposed shot lane in SubFLIP

**Owner:** Hsing/Bruno

**Meeting:** Wednesday 8 AM

**Required Attendees:**

Hsing, Bruno, Patterson, Macgowan, Atherthon, Kilkenny, Larson, Lagin, Wegner, Hamza, Hermann, TALIS, BLIP, Edwards, Campaign Leads /Reps, Diagnostic IPT leads

## Sub-FLIP weekly meeting

**Purpose:** Integrate FLIP Shot plan and Facility plan

**Planning Horizon:** 8 week populated facility plan with 3 week shot look ahead

**Product:** Sub-FLIP Plan - 3 week approved scope by Department stored on the **NIF server** <https://nifsp.llnl.gov/NIF/IPS/SubFlip/Forms/AllItems.aspx>

Type of Scope included in plan:

- Proposed shot plan in SPLAT
- Projects and upgrades
- Jobs with significant facility impacts

\*Scope is extracted from Department Plans in weekly meetings with the NIF Schedule Manager

**Owner:** Bruno

**Required Attendees:**

NOM, Managers, Department Planners with scope within the 3 week window.  
RI's attend as needed to support Dept. Planner

## Guidance for what should be in Sub-FLIP

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- Activities that should be in Sub-FLIP Plan:
  - Proposed shot plan in SPLAT
  - Jobs with significant facility impacts
  - Projects and upgrades
  - Requires shut down of all or part of the laser or a major system for a significant period of time
  - Could preclude shot from proceeding
- Should not be in Sub FLIP Plan:
  - Routine jobs that do not impact the ability to perform shots
  - Routine jobs that could affect shots, but the risks associated with the work are well understood
  - Jobs that affect the laser or a system that can be stopped at anytime....so would not affect the shot from proceeding
- Jobs that Dept Planners are unsure of how to categorize should be presented at Sub-FLIP for a determination
  - Higher risk jobs that do not appear to impede shots

## 9AM Daily DOS meeting

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**Purpose:**

Integrate Work Center activities that are shot predecessors or that have facility impacts with the detailed shot plan.

**Planning Horizon:** 5-day look ahead

**Product** – Proposed 5 day DOS stored on NIF server at <https://nifsp.inl.gov/NIF/IPS/SHO/SitePages/Home.aspx>

Action item list for discussion at 11am Management Meeting

**Owner:** Diane Hardy/Bob Burr

**Required Attendees:**

Shot Director, Work Center Supervisors with scope in 5 day window  
Dept. Planners and RIs as needed to support WCS

## Guidance for what should be included in DOS

- DOS Integrates the following activities:
  - Shots
  - Jobs that affect sweep times
  - TCC activities
  - Target Diagnostics and Optics transaction plans
  - Jobs with significant facility or beampath impacts
  - Major activities in approved Sub-FLIP Plan
  - Maintenance that impacts shots

## Weekly NIF Schedule Manager & Dept Planner meeting

**Purpose:** Weekly meeting between individual Dept Planners and the NIF Schedule Manager to identify scope for the 8 week Sub-FLIP plan.

Plan to be reviewed at the weekly Sub-FLIP meeting

**Planning Horizon:** 8 weeks

**Product** – Proposed Sub-FLIP Plan to be reviewed and approved at the weekly Sub-FLIP meeting

Stored on the NIF server at

<https://nifsp.llnl.gov/NIF/IPS/IFMR/SitePages/Home.aspx>

**Owner** – Diane Hardy

**Required Attendees:**

NIF Schedule Manager & individual Dept. Planners

## 11AM Daily NIF Management meeting

**Purpose:** Schedule Change Board for the DOS , Status hot topics that require management awareness or attention

- Adjudicate priorities and resolve action items from the 9AM DOS

**Planning Horizon:** 5-day look ahead

**Product** – Approved 5 day DOS stored on the

<https://nifsp.llnl.gov/NIF/IPS/SHO/SitePages/Home.aspx>

Meeting minutes distributed via email following meeting

**Owner** – Doug Larson

### **Required Attendees:**

CCB Stakeholders with scope issues in the 5 day horizon, (Campaign/Shot RIs, NIF Project Manager, FLIP, Ops, Engr, Diagnostics, Controls, Optics, Targets)

## 7AM & 3PM Daily POD meetings

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**Purpose:**

Facility Turnover from night shift and 24 hour look ahead using updated DOS and PORT

Brief review of new problem logs that affect shots (7AM meeting only)

ID & adjust for conflicts for next 24 hours in DOS & PORT

**Planning Horizon:** 24 hours

**Product:** Revised DOS and updated PORT

**Owner:** Chuck Ellerbee

**Required Attendees:**

Shot Director, WCO, Work Center Supervisors

Dept. Planners to attend 7AM problem log briefing

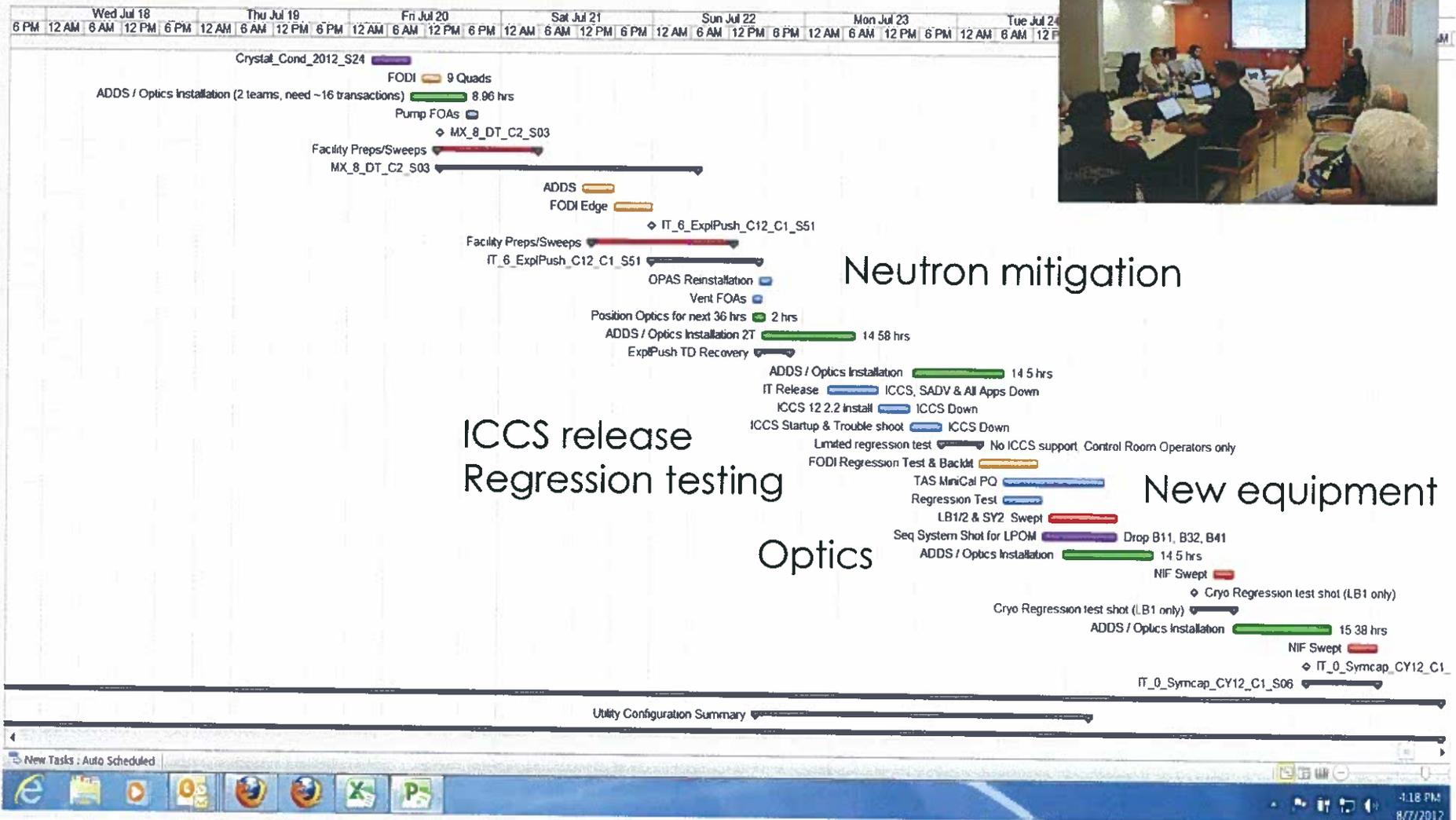
Dept. Planners attend to support WCS when required

end

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# DAILY OPERATIONS SCHEDULE (DOS) - A DAY IN THE LIFE OF NIF - A LOT MORE THAN SHOTS

better planning has improved execution



| Dep Wor t k em | Syst em | Score |
|----------------|---------|-------|
| M 6/3          |         |       |
| M 6/3          |         |       |
| T 6/4          |         |       |
| T 6/4          |         |       |
| W 6/5          |         |       |
| W 6/5          |         |       |
| T 6/6          |         |       |
| T 6/6          |         |       |
| F 6/7          |         |       |
| F 6/7          |         |       |
| S 6/8          |         |       |
| S 6/8          |         |       |
| S 6/9          |         |       |
| S 6/9          |         |       |
| M 6/10         |         |       |
| M 6/10         |         |       |

April 17 RM&R Summary

| Proj Cent | Task  | Score |
|-----------|---|-------|
| SHO SHO   | SHO Last Shot prior to FM&R   Holt_Rugby_Ener_CCC |       |
| SHO BCS   | SHO FODI after last shot                          |       |
| SHO ICS   | ARC Q35T Closed                                   |       |
| SHO T&H   | LM Vent for LM4 and LM8                           |       |

ICCS and IT

|     |           |  |  |
|-----|-----------|--|--|
| QIS | NIFT NIFT | ICCS Release 13.2 - Reboot VX Works as part of Release if not sooner                 |  |
| QIS | ICCS      | ICCS Database clone and 11gr2 upgrade (see Spafford)                                 |  |
| QIS | ICCS      | ICCS Release 13.2.0:   |  |
| QIS | ICCS      | ICCS 1 full day for the release and regression testing. /ICCS controls by 12/        |  |
| QIS | ICCS      | • execute a low energy BM1.1 shot to do charges and aborts on multiple bundles after |  |
| QIS | ICCS      | ICCS manual regression testing/commissioning shots for the KCS 13.2.0                |  |
| QIS | ICCS      | ICCS • CyoT ARPOS with shroud, and cold Target                                       |  |
| QIS | NIFT NIFT | NIF IT Maintenance 0700 to 1500 hrs  |  |

SIS/HS

|     |          |   |  |
|-----|----------|---|--|
| CTS | CSO Tarp | Start Tritium Fill on 6/10 ensure TPS, stack all EPS support is up!               |  |
| CTS | CSO Tarp | Tarpas door closed switch cutter to connect and reset crash button and E-stops    |  |
| CTS | CSO Tarp | Testing Tarpas door closed switch cutter to connect and reset crash button and E- |  |
| CTS | CSO Tarp | Tarpas available for regression testing   |  |

FOM Sommer

|     |      |  |  |
|-----|------|--|--|
| FOM | PORT | PORT LCAL • 10hours setup (3hours swept) anytime before Calibration • Requires 20 hours (non-consecutive) chamber access |  |
| FOM | PORT | PORT Sweep of 29' 6" up due to PORT LCAL - 3 hours only  |  |
| FOM | ARC  | ARC TAB Purge  |  |
| FOM | LM4  | LM4 Q24T - Priority 1  |  |
| FOM | LM8  | Day off / Ar Fill  |  |
| FOM | TB88 | LM8 Q23B or 22B - Priority 2 Perform as Type 1   |  |
| FOM | ARC  | ARC Argon Fill   |  |
| FOM | TB88 | Vent Q34T (TAB Purge)  |  |
| FOM | TB88 | Remove / Reinstall Q34T Removable (T&H)  |  |
| FOM | ARC  | ARC Vent Q35T (TAB Purge)  |  |
| FOM | ARC  | ARC - AM1 Mechanism Installation and IQ  |  |
| FOM | ARC  | ARC Exhaust Tie-In - ABE   |  |
| FOM | DPV  | DPV Tie In   |  |
| FOM | ARC  | ARC - ABE Bellows Installation   |  |
| FOM | ARC  | ARC - ABE Safety Shutters Commissioning  |  |
| FOM | TB88 | Refill Q35T (TAB Purge)  |  |
| FOM | TB88 | Vent Q34T (TAB Purge)  |  |
| FOM | TB88 | Remove / Reinstall Q34T Removable (T&H)  |  |
| FOM | RM   | RM Vent Q34T (TAB Purge)   |  |
| FOM | RM   | RM Vent Q34T (TAB Purge)   |  |
| FOM | LM4  | LM4 Q24T LRU - Remove and Reinstall (T&H)  |  |
| FOM | LM8  | LM8 Q22B LRU - Remove and Reinstall (T&H)  |  |
| FOM | LM8  | Replace Q22B Beamdumps (T&H)   |  |
| FOM | TB88 | Refill RMDE1 and Volume 3  |  |
| FOM | GDS  | Replace Maintenance Panel (broken stud) on 8346 GDS Cover (TAO)  |  |

Target Area Ops

|     |     |   |  |
|-----|-----|---|--|
| TAO | TAO | GDS Cart Swaps on all three DIMS - PDIM on Wed,                                 |  |
| TAO | TAO | GDS Replace Maintenance Panel (broken stud) on 8346 GDS Cover (TAO)             |  |
| TAO | TAO | Q12T Troubleshoot short in wiring B123 CC limit (TAO)                           |  |
| TAO | TAO | PDIV Polar DIM Cable Track handling upgrade - at risk due to parts              |  |
| TAO | TAO | Dant Dant 1/2 XRD Mirror changes  |  |
| TDE | DIM | Modify DIM 90-315-I-Boxes for future cable track upgrade                        |  |
| TAO | INC | 90-31 DIM 90-315 Positioner troubleshooting \$-9 Prob retract switch permissive |  |

LCOM Smalley

|      |      |   |  |
|------|------|---|--|
| LCOM | PORT | LCAL • 10hours setup (3hours swept) anytime before Calibration • Requires 20 hours (non-consecutive) chamber access |  |
| LCOM | PCS  | MESM Switch Rebuilds  |  |
| LCOM | PCS  | DAS Board Upgrades  |  |
| LCOM | PERC | PEG Upgrade 45a - 1 Day   |  |
| LCOM | PAM  | PCU Board Swaps   |  |
| LCOM | LD   | Install Delay Spools for 161SP Perform on 6/4 if no shot, needs DE: Needs 1 or 2 Rod                                |  |
| LCOM | LD   | Convert Rack Group for Bu11 and 12 (Finish on Wednesday 6/12)   |  |
| LCOM | RO   | RO L2 Lens Cleaning (vent TSF on 6/4) Bu 31, 34   |  |
| LCOM | LM4  | Capture setpoints before Ar Vent (6/4) and Re-OQLM4   |  |
| LCOM | LM4  | Capture setpoints and Re-OQLM8 (if we have time)  |  |

