92d Air Refueling Wing

Theory of Constraints
in the Field

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Quality…Safety...Focused

Agenda

1. The Burning Platform

2. Concepts of FLOW

3. Appling Concepts in 92 MXG

4. Results to Date

5. Lessons Learned / Critical Success Factors
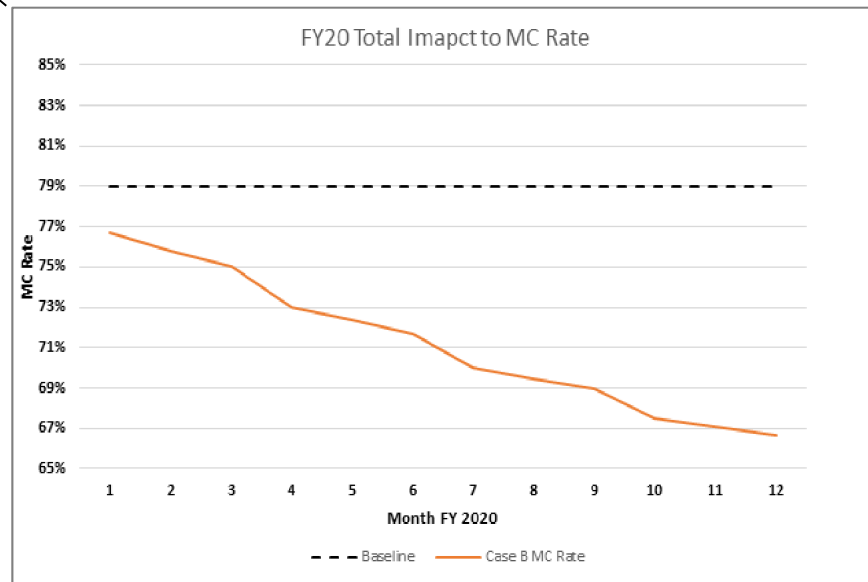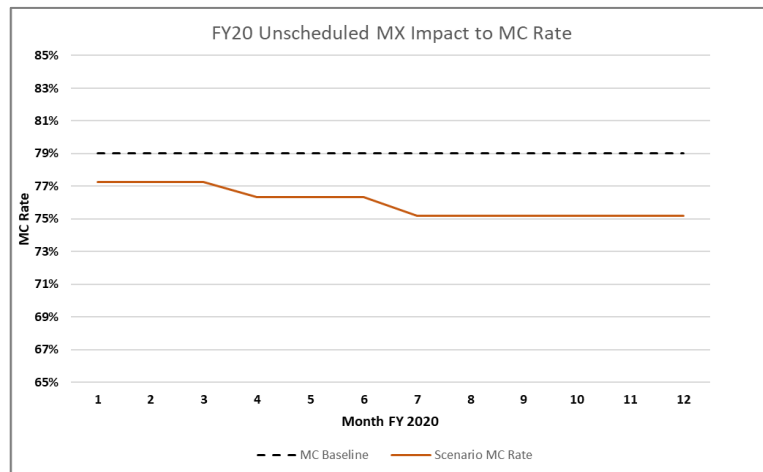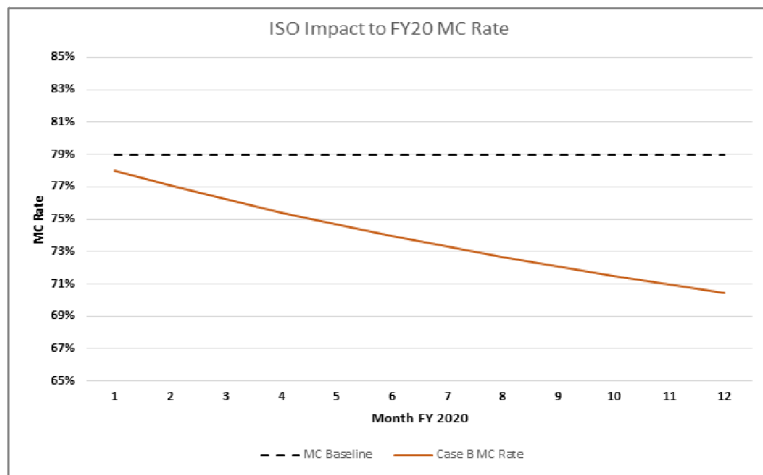
The Why…Burning Platform

- SECDEF edict for CAF community to reach 80% MC rates

  - Corresponding increase in Tanker demand

- On board 19 additional aircraft

  - Need to increase ISO throughput from 14 to 19 in FY20, and from 19 to 30 in FY21
  - Need to perform 260 HPOs, 31 - 900 hr. inspections
  - Similar throughput increases needed for other scheduled & unscheduled work

- Maximize full capabilities of our young workforce

  - Minimize 10+ hour shifts
  - Utilize total workforce to mitigate stressed career fields (i.e. hydraulics)
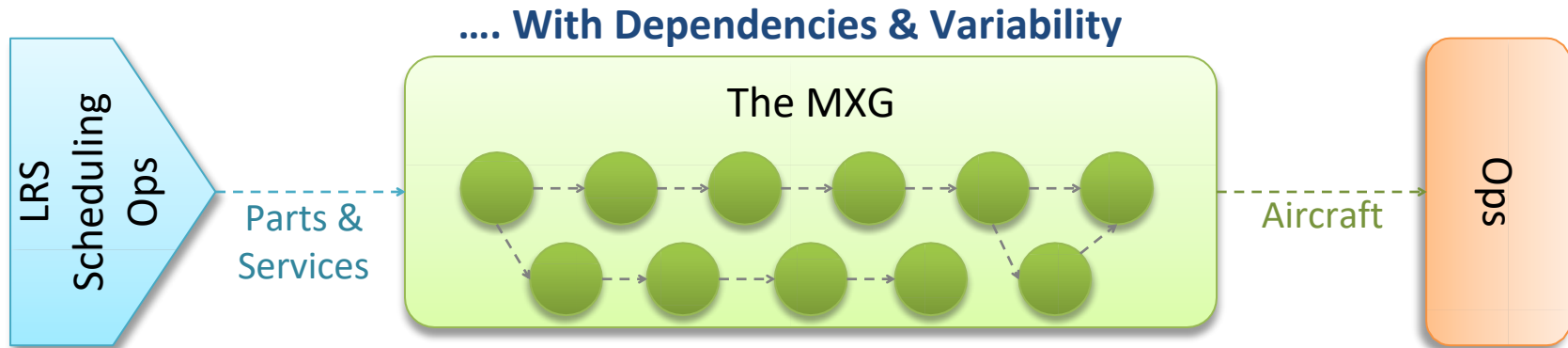 - Deliberate manpower utilization

Projected FY20 MC rate- Status Quo

ISO Impact to FY20 MC Rate

FY20 Unscheduled MX Impact to MC Rate

FY20 Total Imapct to MC Rate

We had to change !!!

Fundamental Premise in TOC –
Every Organization is a System

.... With Dependencies & Variability

LRS Scheduling Ops

Parts & Services

The MXG

Aircraft

Ops

How can we improve overall system performance?

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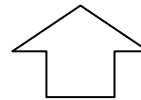
By Improving FLOW
(despite dependencies & variability)

Key Concepts of FLOW

1. **Maintain Low WIP**

   - Concentration of resources on fewer tasks/areas/aircraft

   - Full Kitting work before starting

2. **"Pool" Resources (i.e. avoid silos as much as possible)**

3. **Schedule with aggressive task estimates and shared Buffers**
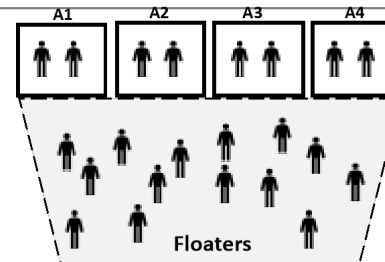
Applying Concepts to MXS

Low WIP
(FK, Res. Conc.)

- ISO WIP of 1 (18 cal. days)
- Staggering areas within ISO & man-loading
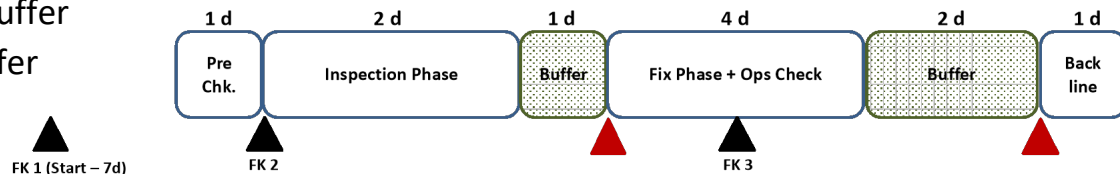- 3 Full Kit points supported by a Full Kit Team

ISO	ISO	ISO

Resource Pooling

- Small team for each area working critical Path items
- Everyone else assigned to different areas based on workload

A1 A2 A3 A4

Floaters

Aggressive Schedule with Buffers

- Pre-check – 1d
- Insp. Phase – 2d + 1d buffer
- Fix Phase – 4d + 2d buffer
- Backline – 1d

1 d	2 d	1 d	4 d	2 d	1 d
Pre Chk.	Inspection Phase	Buffer	Fix Phase + Ops Check	Buffer	Back line

FK 1 (Start – 7d) FK 2 FK 3

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New 18 Calendar-day ISO FLOW

| Pre Chk. | Inspection Phase | Buffer | Fix Phase + Ops Check | Buffer | Back line |

FK 1 (Start – 7d)

FK 2

FK 3

1. 100% inspection complete
2. All parts ordered & routed
3. Be able to predict delivery date
4. Fix phase execution plan ready

1. Power on / hydro L&R on
2. All limiting work complete
3. Panels on (as much as possible)
4. Aircraft is tow capable

1. Prep all tools/parts for insp. phase & scheduled work for fix phase.
2. Sufficient manning to support insp. phase

1. All parts for un-scheduled tasks ready
2. All routed parts back from backshops

1. Robust pre-check review of paperwork
2. Aircraft walk through
3. Assess general health of aircraft
4. Order long lead parts

Three Full Kit Points
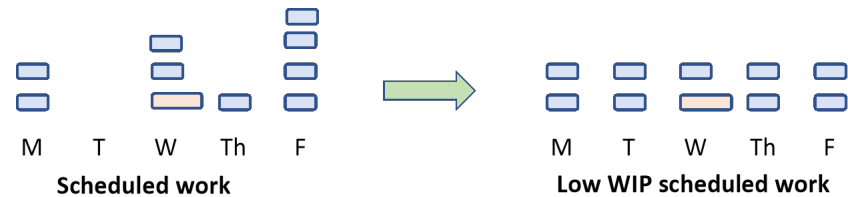## Two Milestones

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Applying Concepts to AMXS

Low WIP
(FK, Res. Conc.)

- Low WIP plan for all scheduled work
- Low WIP for unscheduled work based on available capacity
- Have ready Full Kits wherever possible (HPO, 900hr, pre-flights)

Scheduled work → Low WIP scheduled work
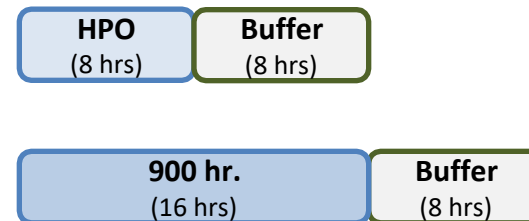
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Resource Pooling

- Single (group level) aircraft priority
- Assign AMU resources across all aircraft in priority order
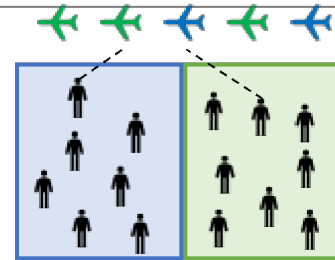
Aggressive Schedule with Buffers
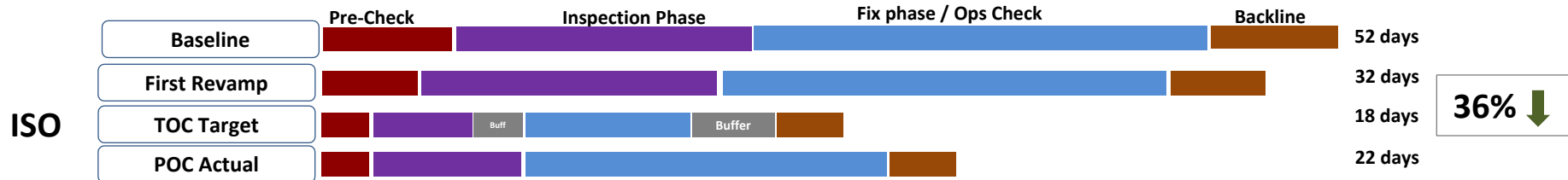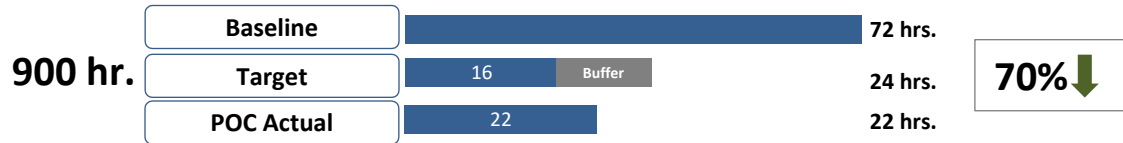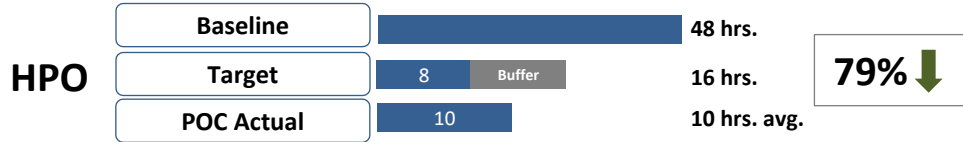
- HPO – 8 hrs. + 8 hrs. of Buffer
- 900 – 16 hrs. + 8 hrs. of buffer

| HPO (8 hrs) | Buffer (8 hrs) |

| 900 hr. (16 hrs) | Buffer (8 hrs) |

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Fairchild TOC Results to Date

HPO

Baseline		48 hrs.
Target	8 / Buffer	16 hrs.
POC Actual	10	10 hrs. avg.

79% ↓

900 hr.

Baseline		72 hrs.
Target	16 / Buffer	24 hrs.
POC Actual	22	22 hrs.

70% ↓

ISO

Pre-Check   Inspection Phase   Fix phase / Ops Check   Backline

Baseline		52 days
First Revamp		32 days
TOC Target	Buff / Buffer	18 days
POC Actual		22 days

36% ↓

~1050 potential additional Sorties in FY20!
(413 from HPOs; 64 from 900 hr.; 570 from ISO)

Days are calendar days

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What's Next??

1. Synchronize Ops flying schedule with maintenance capacity

2. The implementation of moving people to work

3. Codifying the roles and responsibilities to streamline decision making

4. Take advantage of aircraft downtime and maximize maintenance to generate "health"

5. Decorations, OPR/EPR process mapping

6. Process mapping MXG training

Lessons Learned / Critical Success Factors

1. Attack what you can control, and get early wins

2. Set aggressive goals and be willing to break status quo

3. Establish a strong core team and give them the freedom to come up with robust solution including challenging policies

4. Buy-in at leadership level & middle management is crucial – invest senior leadership time in getting buy-in and addressing concerns

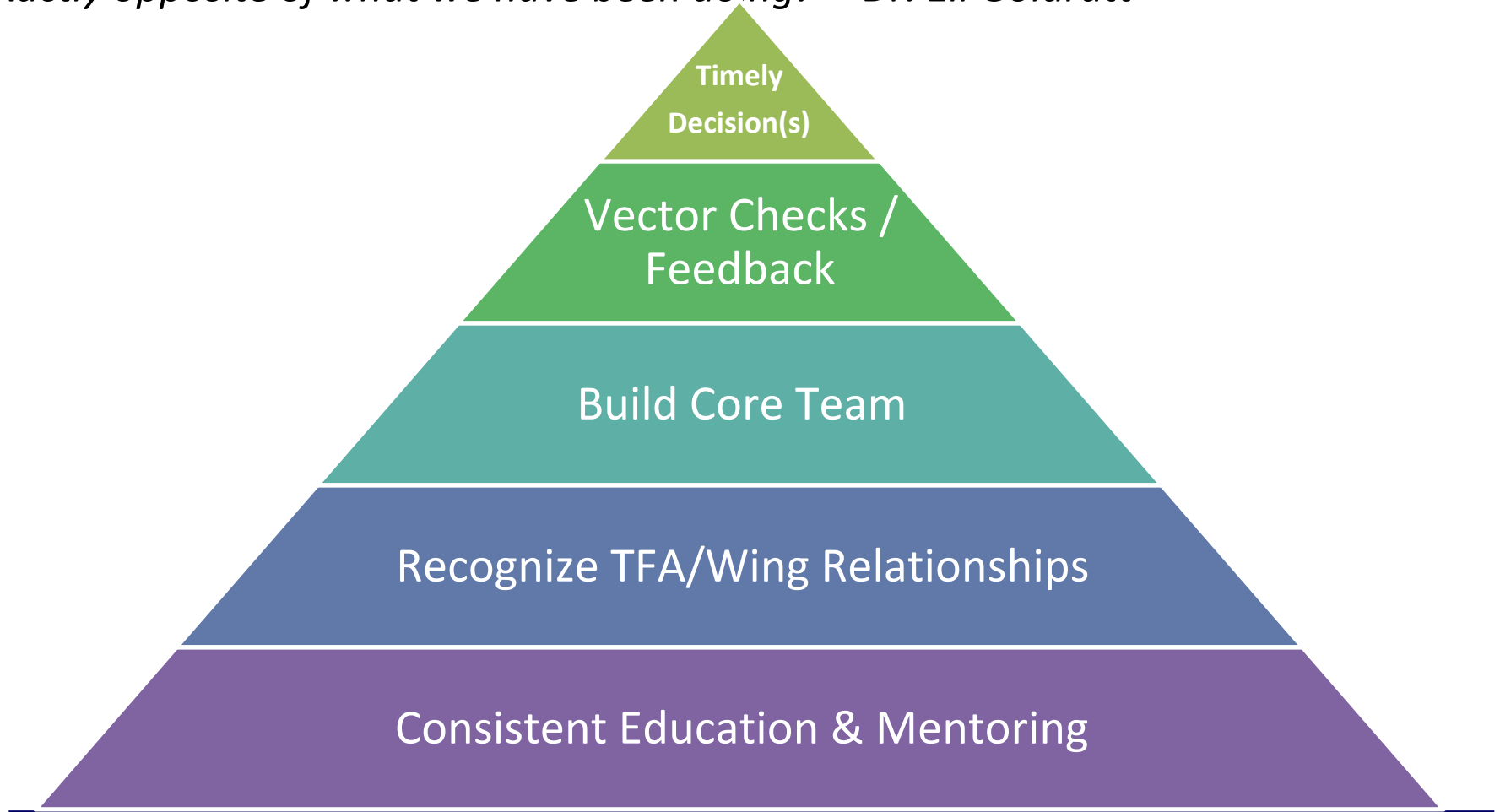5. Break old management paradigms

6. Communicate, communicate, communicate…

Lesson Learned / Critical Success Factors

"If we want to reverse any vicious cycle, we need to do at least one thing which is exactly opposite of what we have been doing!" -Dr. Eli Goldratt

Timely Decision(s)

Vector Checks / Feedback

Build Core Team

Recognize TFA/Wing Relationships

Consistent Education & Mentoring

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Group Level Priorities & WIP Rules

This is a tool to help facilitate decision making among conflicting priorities for Production

Priority Bucket	Description	WIP Limit	Remarks	Justification
1	Flying + alert aircraft	NA	2 per aircraft; Specialties to handle Ops every other week while 900 hr. is in progress	Protect the flying schedule
1a.	Pre-flight	1	4 Crew chiefs, 2 hrs. per aircraft, 8 aircraft per day	
1b.	Fuel	1 for defuel 2 for refuel	2 crew chiefs for refuel; 4 crew chiefs for defuel	
1c.	NM Aircraft flying within 24 hours	WIP of 1 for 3 people	2 of 3 must be qualified	
2	PE	1	Protect PE as much as possible	PE's will queue up if not completed on time.
3	HPO	1 every day	6 crew chiefs, 4 specialties for an hr., 2 shifts back-to-back	A queue of HPO's will result in multiple unavailable aircraft, depleted manning levels, and the risk of negatively affecting the flying schedule.
4	900 hr.	1 (every other week)	8 crew chiefs, 4 specialties for an hr., 3 shifts back-to-back	With a 900hr. every other week, there is less risk of a queue.
5	Other unscheduled & scheduled work	WIP of 1 for 3 people	2 of 3 must be qualified	Not affecting the immediate flying schedule

Within 24 hours

Hydro Priorities
1. Flying + alert
2. PE
3. Sched. Mx. (900/TCTOs)
4. MPRS
5. DIFM
6. Drogue

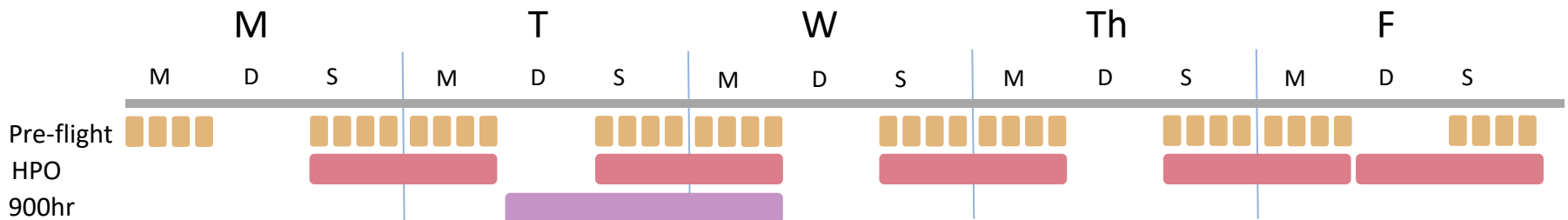Backshop priorities will subordinate to the group's priorities.

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Group Level Priorities & WIP Rules

WIP Limits for Current Aircraft Assignments

- **HPO** – **WIP of 1.** Schedule for 16 hr time slots dynamically based on flying schedule and available manning

- **900 hr. – 1 every other week.** When needed, back-to-back 900hr weeks ok, but no more than 1 per week. Start no later in the week than Thursday, day shift.

- **Pre-flight** – WIP of 1 with 4 people

- **Unscheduled work** – WIP of 1 for every 3 people (2 qualified L5 or L7)