LARS Update

Goals

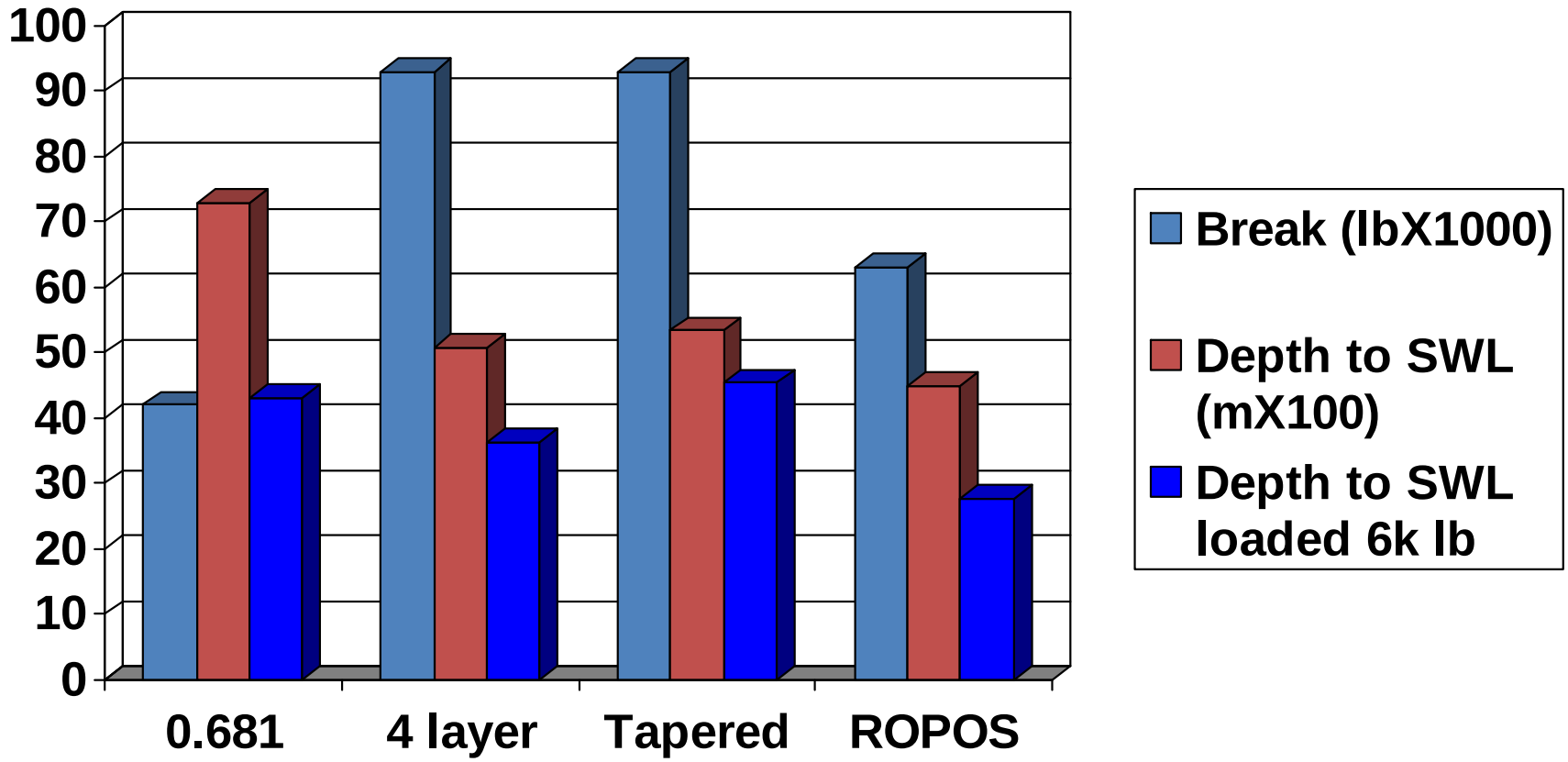
- Increase safety
- Increase weather limit
- Reduce number of people required to launch and Recover (LAR)
- Decrease turn around time (TAT)
- Retain or increase heavy lift for Ocean Observatory Initiative (OOI)

Current System

- **Two Body ROV System**
  - Connected via 65m neutrally buoyant, weighted and buoyed tether forming an ‘S’ catenary providing 100+m watch circle
  - *Jason* 9,000 lb air weight, neutrally buoyant (heavy due to 6.5 km rating)
  - *Medea* is 3,000 lb air weight and 2,100 lb in sea water
    - Decouples ship motion and cable torque from *Jason*
    - Keeps cable weighted during transits
    - Independent platform with cameras, lights, sonar, sensors etc
    - Acts as ‘eye in the sky’ for *Jason*
    - Provides heavy lift capability (4,000 lb to 3,000m, 1,000 lb to 6,000m) via drop hook from *Medea* and lift through *Medea* frame

Cables

- **Depth to Safe Working Load decreases with increased break strength**



LARS Options

- **Two body with swing arrestor added to crane and tether management system added to *Medea***
  - Meets some of the goals
  - 9 people still required, same TAT
  - Small weather limit increase
- **Single body, current cable led through swing arrestor on crane or A-frame**
  - Meets proposed goals with the exception that it drastically reduces heavy lift capability due to cable strength
- **Single body, new 4 km stronger cable led through swing arrestor on crane or A-frame**
  - All the gains of single body, and retains heavy lift through *Jason* frame to 3 km; water weight of cable reduces deeper lifts
- **Single body with 4 km foam pack, current cable led through swing arrestor on crane or A-frame**
  - Meets all goals with reduced heavy lift capability (2000 lb)

Preferred Option

- Single body, retain current .681 fiber optic cable led through swing arrestor
- Articulated crane with swing arrestor for more vessel layout variability
- New shallow foam pack (approx. 1,000 lb lighter)
- 2,000 lb lift capability direct thru Jason frame
- USBL transponder (with attitude sensor) on the cable
- Hall sensor in floating bullet to attach cable
- Retain *Medea* and deep foam block for deep ops which require heavy lift capability
- Considering motion compensation

Single Body Details

- **Manage cable catenary**
  - Control delta depth, wire out and vehicle depth
  - Put USBL transponder on the cable at bottom of centenary

- **Manage cable torque**
  - Count turns of ROV relative to accelerometer package added into the USBL transponder on cable; utilize SMS messaging system
  - Add Hall sensor to attaching bullet to count turns

Single body details

- **Dynacon A-frame system used by ISIS**
  - COTS
  - Reliable
  - Big, limits ops to globals
- **Custom Articulated crane**
  - Not COTS, NRE $
  - Saves space and can be adopted to smaller vessels (Ocean Class) KM, etc.
  - Will pursue integrating crane permanently into Ocean Class vessel
- **Motion compensation to be considered**