



Evaluating the Medical Kit System for the International Space Station A Paradigm Revisited

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Overview



- Kit history, function
- Additional considerations driving update
- Users
- Implementation of new kits
- Lessons learned



History & Function



- System functions
 - Nominal preventive health care
 - Treatment for minor illness / injury
 - Some advanced life support capability
- Launched in support of ISS Expedition 1
 - Designed to support crew of three for a 6-month mission
 - Designed to be prepared on the ground and resupplied in total on a shuttle with each crew rotation
 - Shuttle program events required real-time change to support paradigm
 - Logistic support via international partner vehicles
 - On-board crew required to do inventory and integration work to keep kits contents up to date and in a known configuration.



Additional Considerations



- Hardware Obsolescence
- Medication Issue
 - Medication no longer available
 - Delivery system obsolete
 - Unable to procure injectable medications in desired packaging
- Adapt design to accommodate multi-country shipping and logistics chain and on-board maintenance by the crew.
- Accommodate addition/deletion/change of hardware in kits
 - Updates to required testing
 - Example Eye equipment
 - Identify and certify COTS hardware where possible as opposed to in-house development.



ISS Medical Kit Users



- 6 Crewmembers on ISS
 - 4 trained as Crew Medical Officers (CMO)
 - CMO
 - Wide spectrum of professional and health system backgrounds
 - IP crew can also be CMO
 - Typical CMO has a technical/engineering background
 - Approximately 25 hours of crew training available to learn CMO role
- In-flight support of CMO duties is augmented with
 - Communication with medical support team
 - (video conference, email, phone)
 - ISS Medical Checklist
 - Provide directive steps in support of routine activities and medical intervention



**Ventilator / Oxygen
Supplementation**



Personal Protective Equipment



Defibrillator

**Restraint /
Electrical Isolation**

System Components



Ambulatory Medical Pack (AMP)



HMS Ancillary Support Pack (HASP)



Advanced Life Support Pack (ALSP)

Durable and consumable medical items:

- Medications
- Tools (wound repair, dental)
- Bandaging supplies
- Bladder catheterization items
- IV catheterization
- Physical exam hardware



New ISS Medical Kits



Non-Emergency Medication

1. Convenience Medications
2. Oral Medications
3. Topical & Injectable Medications

Non-Emergency Hardware

4. Medical Diagnostic
5. Minor Treatment
6. Medical Supply
7. IV Supply
8. Physician's Equipment

Emergency Medication and Hardware

9. Emergency Medical Treatment



Exterior/Interior Softgoods Design



Front



Inside with locator card





Injectable Medications



- Small, consistently sized footprint
- No air in syringe
- Reduced shelf life due to repackaging

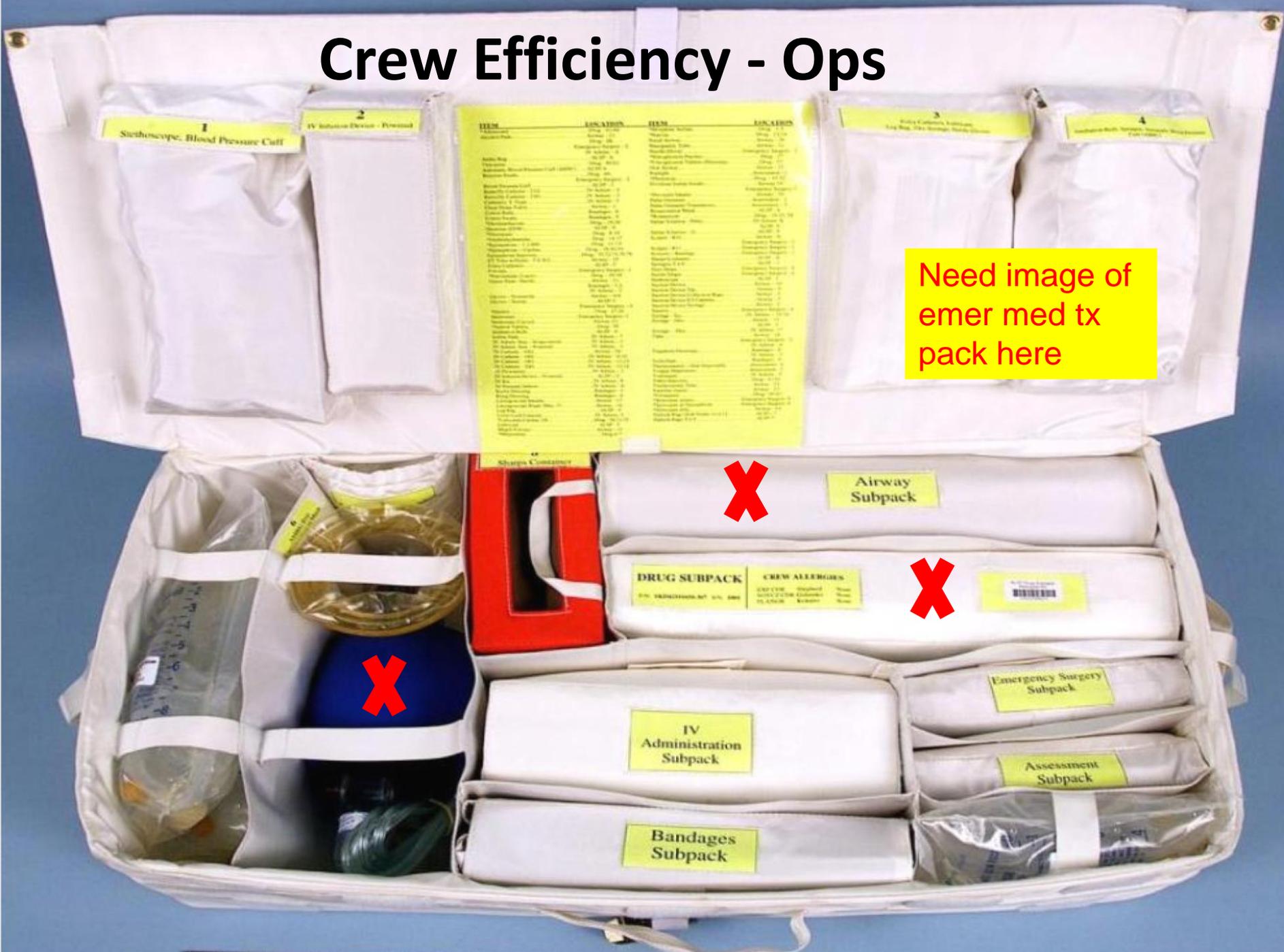


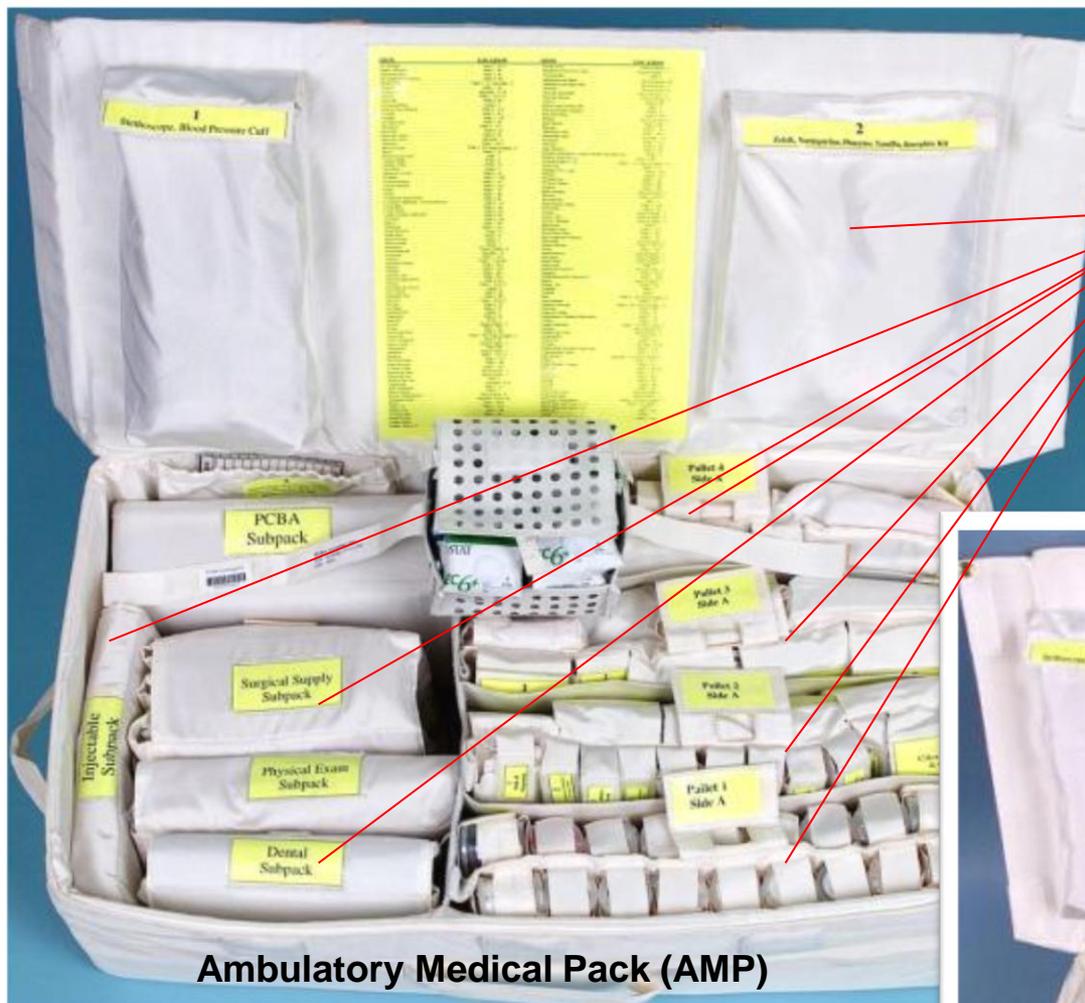


Injectable Medications



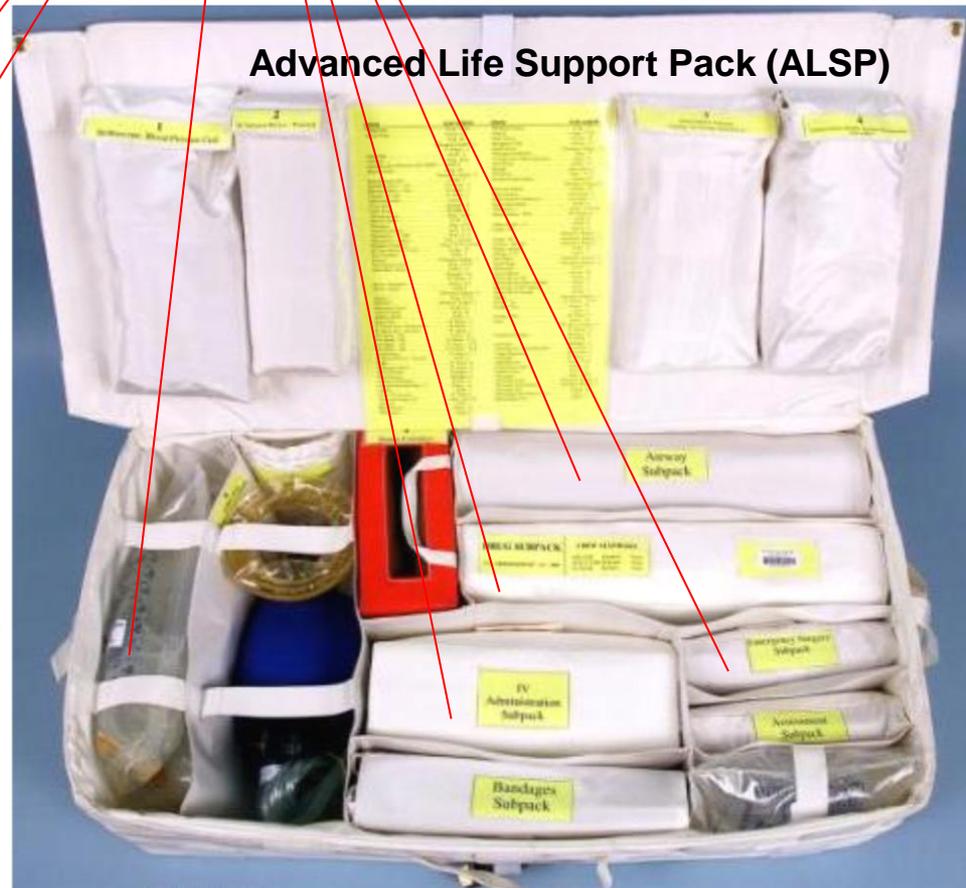
Crew Efficiency - Ops





Ambulatory Medical Pack (AMP)

Short Shelf-Life Items (medications, consumables)



Advanced Life Support Pack (ALSP)

Crew Efficiency – Resupply

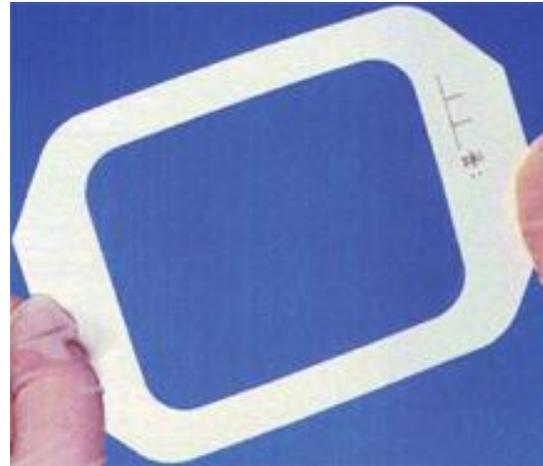


Accommodate Hardware Modifications





Miscellaneous Improvements





Lessons Learned



- Thoroughly define requirements are a challenge to develop
 - All requirements revisions have significant system impacts
 - Huge variability in commercially available equipment
 - Imprecisely worded requirements make capturing the correct equipment difficult.
- Use of commercially acquired goods requires flexibility
 - Kit design
 - Procedures and training
- Think Efficiency when selecting hardware
 - Make items serve multiple purposes
- Communicate
 - Engineering and clinical stakeholders don't always speak the same language
 - Miscommunication impacts can have broad impacts (procedures, training)



Implementation



- Launched to ISS via a Russian Progress on 30 April
- Planned on-board implementation in June 2011
- Expedition 27/28 will be first users
- Miscellaneous
 - Rewrote >120 ISS Medical Checklist procedures
 - Modified 10 training lesson plans and classes
 - >200 unique medical items included in new kits

Questions?



82nd Annual Scientific and Human Performance Meeting Disclosure Statement

We have no financial relationships to disclose.

We will not discuss off-label use and/or investigational use of medications in this presentation .