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AUTOMATED CONFLICT RESOLUTION ISSUES

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INTRODUCTION

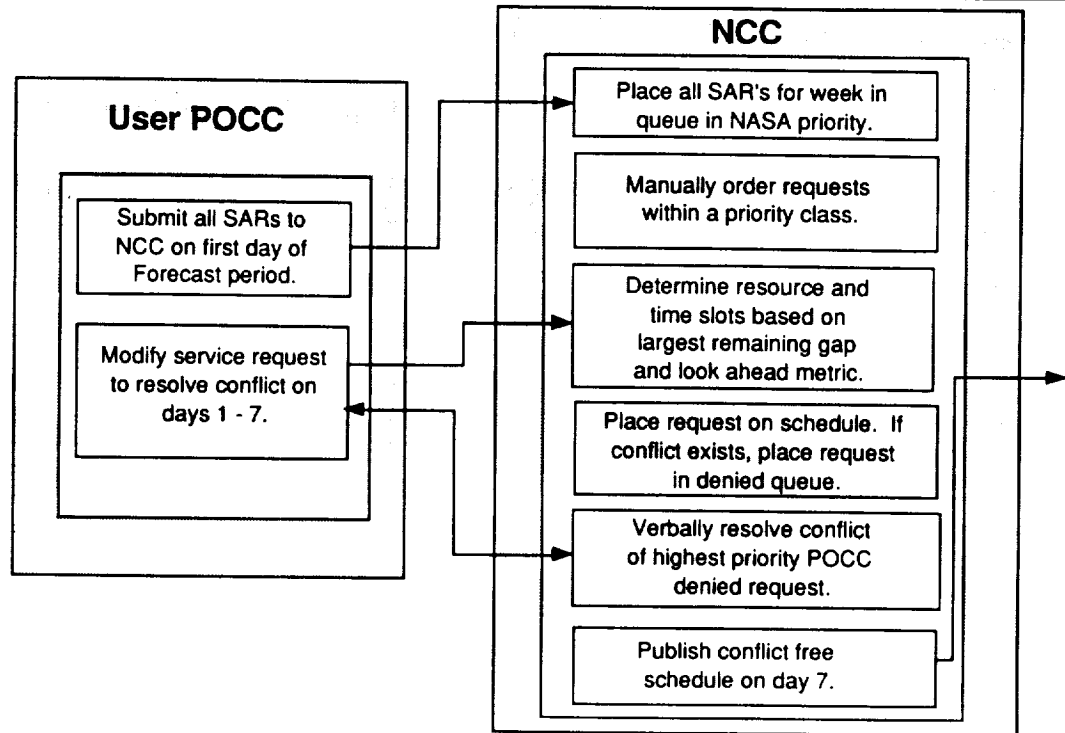
Purpose:

- **To initiate discussion of how conflicts for Space Network resources should be resolved in the ATDRSS era.**

Topics:

- **Describe how resource conflicts are currently resolved.**
- **Describe issues associated with automated conflict resolution.**
- **Present conflict resolution strategies.**
- **Suggest discussion topics.**

CURRENT SN CONFLICT RESOLUTION



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CURRENT OPERATIONAL LIMITATIONS

Current conflict negotiation is a verbal, time consuming process between Forecast Analysts and user POCCs.

Security prohibits POCCs from accessing entire schedule.

Forecast Analyst lacks automated scheduling tools and user knowledge.

Current SN service requests do not utilize POCC tolerance.

- Requests allow specifying plus or minus time tolerance.
- Configuration codes may indicate "open selection" for antenna and interface channel.

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CURRENT SOFTWARE LIMITATIONS

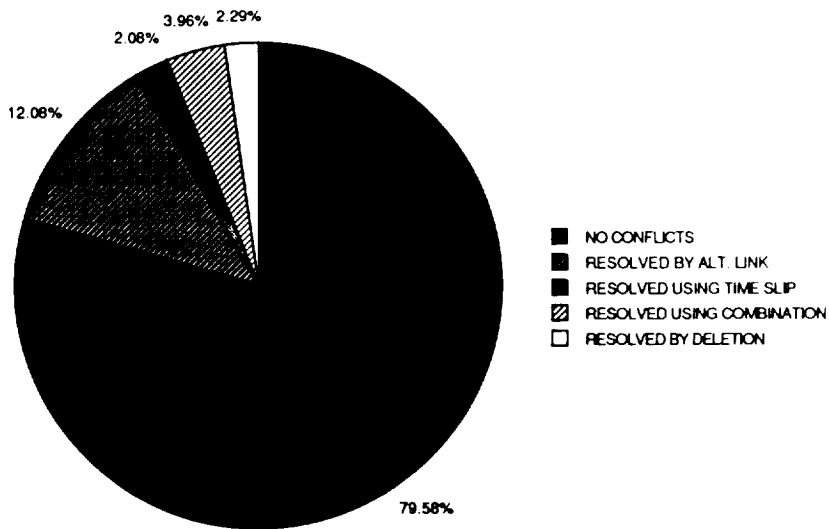
Current NCC scheduler emphasizes conflict avoidance, rather than conflict resolution.

- Events scheduled to avoid potential conflicts.
 - Leave largest gap of unscheduled time
 - Look-ahead metric schedules event to avoid conflict with remaining events.

No knowledge of the applicability or preference of individual conflict resolution strategies.

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CURRENT CONFLICT RESOLUTION



The fact that ninety percent of the conflicts were resolved indicates that user flexibility exists.

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ATDRSS ERA CONFLICT RESOLUTION

ATDRSS era service requests will increase three to ten fold.

Manual conflict resolution will cause unacceptable response times and life cycle costs.

Automated conflict resolution requires knowledge:

- Embedded in the SNC scheduling system.
- Identified by the user POCC in each specific service request

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EMBEDDED KNOWLEDGE

Knowledge requirements:

- **User capabilities**
- **User preferences**
- **SN resource data**

Conflict resolution profile created for each user POCC

- **Hierarchy of conflict resolution strategies**
- **Service parameter tolerances and dependencies**

SNC generated alternatives approved by the user POCC.

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USER SPECIFIED KNOWLEDGE

Include knowledge in the user POCC service request.

Prioritize request tolerances and alternatives.

Information exchange facilitated by implementation of a user Pocc workstation.

- Graphically display schedule and service flexibility.
- Simultaneously display data at the SNC and POCC.

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FACTORS INFLUENCING CONFLICT RESOLUTION

Organizational goals affecting conflict resolution are:

- **NASA established user POCC priority.**
- **Certain users assigned specific links.**
- **Hold back resources as spares.**
- **Maximize utilization of single resources.**
- **Leveling of resource utilization across the system.**
- **Rewarding cooperation.**

Operational limitations affecting conflict resolution:

- **Development (forecast) period.**
- **Maintenance (active) period.**
- **Spacecraft emergencies.**

MANUAL CONFLICT RESOLUTION

Special circumstances will require manual conflict resolution by the SN scheduling analyst.

- Two POCCs with same priority (Space Station and Space Shuttle) have a resource conflict.
- Spacecraft emergencies conflict with higher priority user POCC services

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CONFLICT RESOLUTION STRATEGIES

Potential strategies include:

- **Priority.**
- **Moving a service in time.**
- **Moving a service to the previous or next valid view period.**
- **Switching to an alternate resource.**
- **Shrinking a service duration.**
- **Breaking up a prototype event into individual services, and performing separate conflict resolution strategies on the individual services.**
- **Breaking up a service into multiple discontinuous services, or gapping.**
- **Combinations of the above strategies.**
- **Deleting a service from the schedule.**

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DISCUSSION TOPICS

- **What specific conflict resolution strategies are applicable to the user POCCs?**
- **How much would conflict resolution strategies and preferences vary between services of a specific user POCC?**
- **How much would conflict resolution strategies and preferences vary between different user POCCs?**
- **Does a hierarchy of strategy preferences exist?**
- **Under what circumstances should manual conflict resolution be required?**
- **How amenable to automatic conflict resolution are user POCCs?**
- **How much and what type of tolerance could be communicated to the NCC from user POCCs?**
- **How much would tolerances vary between services of a specific user POCC?**

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